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CYCLONE RIDGE FIRE

TIMBER SALVAGE ENVIRONMENTAL ASSESSMENT CHECKLIST

January 2001

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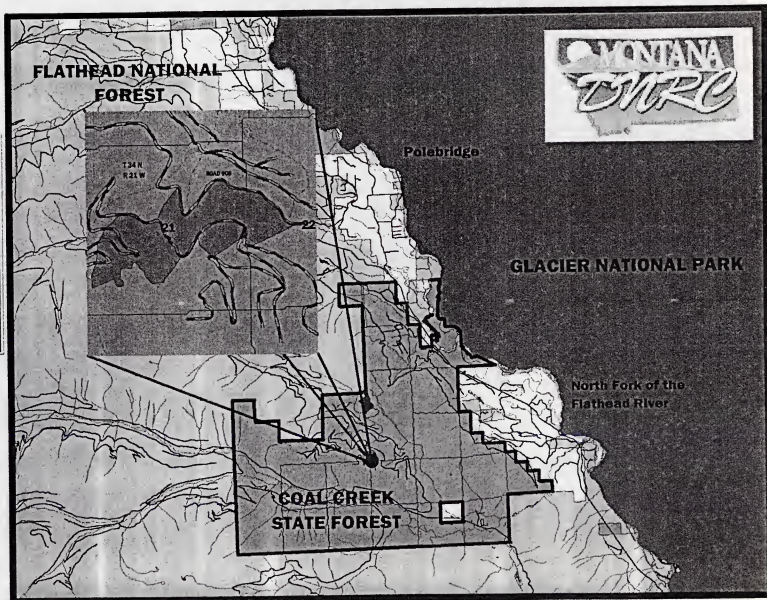
CYCLONE RIDGE FIRE SALVAGE

GENERAL VICINITY MAP



LEGEND

- CYCLONE RIDGE FIRE
- LAND OWNERSHIP**
 - DNRC
 - Forest Service
 - National Park Service
- Roads
- Streams

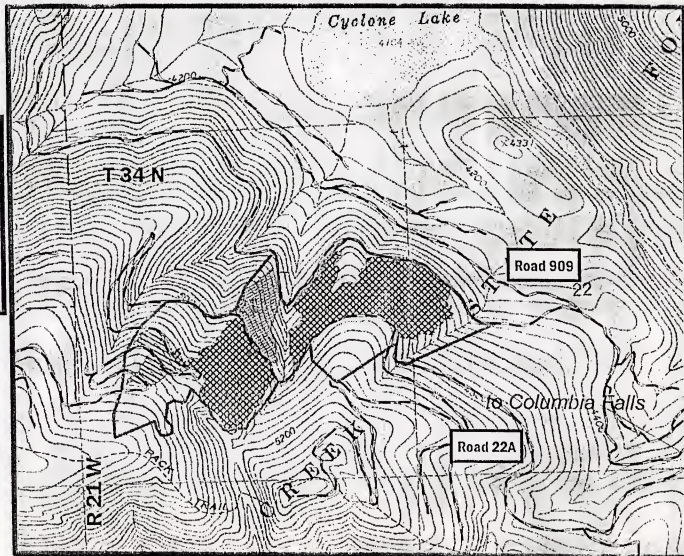


CYCLONE RIDGE FIRE SALVAGE PROPOSED TIMBER SALE AREA MAP



LEGEND

-  CYCLONE FIRE PERIMETER
- HARVEST UNITS**
-  SKYLINE
-  TRACTOR
-  TRACTOR & SKYLINE
-  EXISTING ROADS
-  STREAM COURSE



FINDING
PROPOSED CYCLONE RIDGE FIRE SALVAGE
TIMBER SALE PROJECT

An interdisciplinary team (ID Team) has completed the Environmental Analysis Checklist (EAC) for the proposed Cyclone Ridge Fire Salvage Timber Sale Project. After a thorough review of the EA, project file, public correspondence, Department policies, standards and guidelines, and the State Forest Land Management Plan (SFLMP), I have made the following 3 decisions:

1. ALTERNATIVE SELECTED

Three alternatives are presented and were fully analyzed in the EA:

- No-Action Alternative A includes existing activities, but does not include the salvage of timber from the Cyclone Ridge Fire. The road opened for fire suppression would be closed with a tank trap and at least the first 200 feet of roads behind the berms being covered with slash or a series of "Kelly humps" to discourage human use of the roads.
- Action Alternative B, which proposes harvesting 946 thousand board feet (MBF) of burnt timber, install surface drainage on roads opened and used for fire suppression; build approximately .5 mile of temporary roads, which will be reclaimed after harvesting activities are completed; plants western larch and rust-resistant western white pine in areas that are salvaged; and will reclose the road opened for fire suppression with a tank trap and at least the first 200 feet of roads behind the berms being covered with slash or a series of "Kelly humps" to discourage human use of the roads. Harvesting and road use activities would be allowed from July 1 through September 15, 2001.
- Alternative C proposes the exact same actions as Alternative B, except harvesting and road-use activities would be allowed for a period of only 30 consecutive days between July 1 and September 15, 2001.

I have selected the Alternative B with the following mitigation option for effects from motorized access:

Three options were presented in the Checklist EA to mitigate for increased disturbance and motorized access for Alternative B. I have selected to implement option three.

I made this selection for the following reasons:

- Action Alternative B meets the Purpose of Action and the specific project objectives listed in the Checklist EA on page 1.
- It is not feasible, nor cost effective, to complete harvest-related activities within a 30-day limitation as included in Alternative A.

- Grizzly bears have the most habitats available during the summer season, and the fire salvage area is not considered critical summer habitat.
- The analysis of identified issues did not reveal information to persuade the Department to choose the No-Action Alternative.
- Action Alternative B includes a number of mitigations to address environmental concerns expressed by the public and reduce the effects of salvaging timber on various resources.

2. SIGNIFICANCE OF IMPACTS

For the following reasons, I find that Action Alternative B will not have significant impacts on the human environment:

- I find that none of the impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of various resources, including any that may be considered unique or fragile will not be adversely affected to a significant degree. I find no precedent for future actions that would cause significant impacts, and I find no conflict with local, State, or Federal laws, requirements, or formal plans. In summary, I find that the identified adverse impacts will be avoided, controlled, or mitigated by the design of the project to an extent that they are not significant.
- Concerning the motorized-access-option modification, Option 3 provides the highest level of security mitigation for grizzly bears. At the same time, Option 3 has limited effects on continued management of Coal Creek State Forest and a minimal expense of implementation.
- Precedent Setting and Cumulative Impacts

The project area is located on State-owned lands that are "principally valuable for the timber that is on them or for growing timber or for watershed protection" (*Montana Codes Annotated* 77-1-402). The proposed timber sale is similar to past projects that have occurred in the area. Since the EA does not identify future actions that are new or unusual, the proposed timber sale is not setting precedence for a future action with significant impacts.

Taken individually and cumulatively, the identified impacts of the proposed timber sale are within threshold limits. Proposed timber sale activities are common practices and none of the project activities are being conducted on important fragile or unique sites.

The proposed timber sale conforms with the management philosophies adopted by DNRC in the SFLMP and is in compliance with existing laws, policies, guidelines, and standards applicable to this type of proposed action.

3. SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

Based on the following, I find that an EIS does not need to be prepared:

- The EA adequately addressed the issues identified during project development and displayed the information needed to make the decisions.
- Evaluation of the potential impacts of the proposed timber harvest salvage indicates that no significant impacts would occur.
- The ID Team provided sufficient opportunities for public review and comment during project development and analysis. Public concerns were incorporated into the project design and analysis of impacts.

Robert L. Sandman



Unit Manager

Stillwater/Swan State Forests

2/2/01

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PROJECT VICINITY MAP

ACRONYMS

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name: Cyclone Ridge Fire Salvage Proposed Implementation Date: July 1-Sept 2001
 Proponent: Montana Department of Natural Resources and Conservation (DNRC)
 Type and Purpose of Action: DNRC proposes to salvage approximately 946 MBF of burnt timber from the Cyclone Ridge Fire. Approximately 104 of the 200 acres burned would be harvested. The primary objective is to capture The value of the burnt timber for the School Trusts fund and implement rehabilitation work on the site (see attached map of proposed harvest units).
 Location: Sections 21 and 22, T34N, R21W (see Vicinity Map - back of front cover)
 County: Flathead

I. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED: Provide a brief chronology of the scoping and ongoing involvement for this project.	[Y] On October 13, 2000, public comment was solicited by sending notices of the proposed salvage logging to citizens and organizations that have requested information on DNRC projects and local landowners. A 30-day comment period followed; comment was received from: Riley McClelland, Patrick Kearney, Montanans For Multiple Use, F.H. Stoltze Land and Lumber Company, Owens and Hurst Lumber Company, Alliance for the Wild Rockies, The Ecology Center, Inc., and Friends of the Wild Swan. See <i>SUMMARY OF CONCERNS RECEIVED FROM INITIAL SCOPING, APPENDIX C</i> for the summarization of the relevant issues addressed in these letters.
2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:	None
3. ALTERNATIVES CONSIDERED:	Three alternatives were analyzed in this document: • No-Action Alternative A - Current management and natural disturbances would continue. Burnt timber would not be salvaged. Some surface drainage would be installed on the road that was opened and used for fire suppression. • Action Alternative B - Approximately 946 MBF of burnt timber would be salvaged from approximately 104 acres. Surface drainage would be installed in existing road segments that were opened and used for fire suppression. Western larch and western white pine would be planted in areas that were burned and salvaged. Approximately .5 miles of temporary road may need to be built to yard timber. Harvesting activities would be allowed from July 1 through September 15, 2001. The temporary roads would be reclaimed after the completion of harvesting activities. • Action Alternative C - Same as Action Alternative B, except harvesting activities over 77 to 104 acres would be allowed for a period of only 30 consecutive days between July 1 and September 15, 2001 (see further details in <i>FIRE OVERVIEW, APPENDIX B</i>).

II. IMPACTS ON THE PHYSICAL ENVIRONMENT

RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES N = Not present or No Impact will occur. Y = Impacts may occur (explain below).
4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE: Are fragile, compactible or unstable soils present? Are there unusual geologic features? Are there special reclamation considerations? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] <i>Existing Environment:</i> The dominant soils in the project area are silty glacial tills (Dysteric Chryochrepts in a loamy-skeletal, mixed family). The existing road system is approximately 30 years old and the cut-and-fill slopes are mostly revegetated. Slopes run from 10 to 70 percent. No fragile, unstable, or unusual geological features exist. Approximately 2.25 miles of fireline was constructed with dozers and excavators, and .75 miles of handline was constructed in an effort to contain the Cyclone Ridge Fire in August 2000. <i>Direct and Indirect Impacts:</i> No-Action Alternative A - No direct or indirect impacts on soils would be expected. Some erosion would occur from the disturbances that occurred from the fire and fire-suppression actions. Action Alternatives B and C: Potential direct impacts, including rutting, erosion, compaction, and displacement, caused by salvage-related activities would be expected. By applying the mitigation measures (see <i>STIPULATIONS AND SPECIFICATIONS, APPENDIX A</i>) that are designed to limit adverse impacts to the soil resource, the resulting impacts should be within the standards and guidelines of the State Forest Land Management Plan (Plan) and would comply with Best Management Practices (BMPs). <i>Cumulative Impacts:</i> The impacts of the salvaging activities would be in addition to impacts from fire-suppression measures. Fireline-rehabilitation activities are currently being implemented that will limit short-term and long-term impacts from fireline construction (see <i>STIPULATIONS AND SPECIFICATIONS, APPENDIX A</i>). Impacts from the Cyclone/Coal '99 and 2000 timber sales were considered in this analysis.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION: Are important surface or groundwater resources present? Is there potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality? Are cumulative impacts likely to occur as a result of this proposed action?	[V] Existing Environment: Assessment of the proposed project area showed that the existing road system is high standard and constructed of stable materials. The fire has removed the majority of the ground vegetation in most areas of the fire. Fire intensity was lower in the draws and creek bottoms, but some of these areas were also burned to mineral soil. Bare soil on slopes and near creek bottoms may generate higher sediment delivery for a couple of years until vegetation reestablishes. At the time of survey, sediment delivery to creeks from burned areas was not occurring. Channel stability data gathered on Cyclone Creek during the Cyclone/Coal '99 Timber Sale showed the creek in good condition above and below Cyclone Lake. Creeks within the proposed project area also have good channel stability. According to procedures outlined in the analysis-methods discussion, the water-yield threshold for the Cyclone Creek watershed is 13 percent. Direct Effects: No-Action Alternative A - No direct effects to sediment delivery would be expected beyond those currently occurring. No direct effects to water yield would be expected. Action Alternatives B and C - No direct effects of sediment delivery to the project-area watershed or Cyclone Lake would be expected. Skidding through a stream would not occur; no stream crossing replacements would be needed. No direct effect on water yield would be expected beyond those shown in the existing-condition discussion (see <i>WATERSHED ANALYSIS, APPENDIX G</i>). The timber proposed for removal was killed by the fire. As a result, the water yield increases already occurred when the fire burned the area. The removal of dead trees would not create any effect on water yield. Indirect Effects: No-Action Alternative A - Sediment delivery to Cyclone Lake may be reduced through the installation of surface-drainage features on the existing road system. No direct effects to water yield would be expected. Action Alternatives B and C: Timber salvaging activities may indirectly lead to increases in sediment delivery to Cyclone Lake, though this may occur on a reduced number of acres for Action Alternative C. Placement of erosion control and BMP measures in all skid trails would minimize the risk of soil erosion, and, subsequently, the delivery of sediment to a draw or creek. No indirect effect on water yield would be expected beyond those shown in the existing condition (see <i>WATERSHED ANALYSIS, APPENDIX G</i>). Cumulative Effects: No-Action Alternative A - A cumulative effect would likely be a net decrease in total sediment delivery to Cyclone Lake. No cumulative effect on water yield would be expected beyond those shown in the existing condition (see <i>WATERSHED ANALYSIS, APPENDIX G</i>). Action Alternatives B and C: Cumulative sediment delivery to Cyclone Creek would be the same as those discussed in the existing condition (see <i>WATERSHED ANALYSIS, APPENDIX G</i>). The direct and indirect impacts discussed above, combined with existing conditions from past management, may lead to increased sediment loads to the creeks within the project area. It is unlikely that these sediment increases would reach Cyclone Lake. If sediment were transported to Cyclone Lake, turbidity increases would be minor and may not be measurable. No cumulative effects to water quality would be expected beyond those shown in the existing condition discussion (see <i>WATERSHED ANALYSIS, APPENDIX G</i>).
6. AIR QUALITY: Will pollutants or particulate be produced? Is the project influenced by air quality regulations or zones (Class I airshed)? Are cumulative impacts likely to occur as a result of this proposed action?	[V] Existing Environment: The project area is located in Montana Airshed 2. The project area is approximately 4 miles from Glacier National Park, which is designated as a Class 1 airshed by the Federal Clean Air Act. Temporary reductions in air quality currently occur from wildfires, prescribed broadcast burning, and road dust. Direct and Indirect Impacts: No-Action Alternative A - Impacts over the existing levels of air quality would not be created. Action Alternatives B and C: Since only burned timber is proposed for harvesting, no slash burning will be necessary; thus, no smoke will be created. Some road dust may occur from yarding activities and log hauling. However, stipulations will be incorporated into the contract that require some site-specific road watering, if necessary, to abate dust. Cumulative Impacts: No-Action Alternative A - No cumulative impacts to air quality would be expected. Action Alternatives B and C - Cumulative effects from harvesting activities may occur if burning and road construction activities on the Cyclone/Coal '99 and 2000 timber sales and activities on adjacent ownerships occur at the same time.

7. VEGETATION COVER, QUANTITY AND QUALITY: Will vegetative communities be permanently altered? Are any rare plants or cover types present? Are cumulative impacts likely to occur as a result of this proposed action?	(Y) Existing Environment: Approximately 78 percent of the timber stands prior to the fire were classified in the old-growth age class within the fire perimeter; the remaining stands were in the 0-to-39-year age class. The area was dominated by the subalpine fir cover type (87 percent). Mortality occurred in approximately 85 percent of the mature timber stands within the fire perimeter; small pockets of unburned timber include a species mix of subalpine fir, Engelmann spruce, lodgepole pine, and western white pine. Also, scattered large Douglas-fir and a few western larch were exposed to fire, but may survive. On the landscape level, Coal Creek State Forest contains approximately 1,258 acres of old growth that is classified as a subalpine cover type. A minimum of approximately 188 acres of subalpine fir old-growth is required to be maintained (Cyclone/Coal DEIS 2000). In the project area, prior to the fire and, currently, adjacent to the fire, mortality has been attributed to Douglas-fir and spruce bark beetles and Armillaria root rot. Direct Effects: No-Action Alternative A - The cover type may change to western larch/Douglas-fir for the immediate future, or portions of the area may remain unstocked. There would be no effect on age class. No effect on the amount and distribution of old growth would occur. Occurrences of root rot mortality are likely to be less because fire has reduced the amount of available hosts. A buildup of large populations of bark beetle and successful reproduction is an increased risk in the fire area. The encroachment and establishment of noxious weeds would remain the same. Action Alternatives B and C - The cover type would be converted over 104 acres to a western larch/Douglas-fir covertype or, potentially, a western white pine cover type. The age class or old growth would not be directly affected. Species that are less susceptible to root rot would be planted. The salvage harvesting would reduce the risk of bark beetle buildup within the fire perimeter. Additional mineral soil will be exposed, thus, increasing the risk of noxious weed establishment (see STIPULATIONS AND SPECIFICATIONS, APPENDIX A). Snags and coarse woody debris would be reduced. Approximately 8 tons per acre would be retained for wildlife and seed sources, along with other unsalvageable burned trees. Approximately 12 to 18 tons per acre of coarse woody debris will be retained on site. Action Alternative C may occur on a reduced number of acres (up to 27 acres less). Indirect Effects: No-Action Alternative A - A stand that is established through natural regeneration is likely to have few western white pine and, potentially, few western larch in the species mix due to a lack of seed sources. The risk of areas becoming occupied by shrubs and delaying the establishment of a stand of trees is increased. Where shrubs prevent regeneration, the age class would be considered nonstocked for an extended period of time. Bark beetle population buildups may cause mortality in adjacent timber stands. The amount of snags and coarse woody debris would not change. Action Alternatives B and C - The percentage of western white pine in the stand would increase, and there would be, potentially, a higher success rate of natural-regeneration establishment. The risk that shrub competition would delay the establishment of trees in the area would be reduced. An old-growth stand that developed from these alternatives would have a higher percentage of western white pine and western larch in the overstory dominants. The timing of the proposed harvest could substantially reduce the bark beetle population in the immediate fire area and, subsequently, reduce incidence of attack in adjacent mature timber stands. Over the long term, where mitigation measures to control noxious weeds are not successful, additional populations will occur; this may require further weed-management actions or have adverse effects on native vegetation. Cumulative Effects: No-Action Alternative A - The changes in cover type that have occurred because of the fire are in addition to the changes that have occurred from timber harvesting in the Cyclone/Coal '99 Timber Sale and, potentially, would occur in the Cyclone/Coal 2000 Timber Sale (see VEGETATION ANALYSIS, APPENDIX D). Alternative A would likely reduce the trend of past timber sales to minimize the occurrence of tree mortality from bark beetle and root rot attacks. Action Alternatives B and C - The Cyclone/Coal '99 and 2000 timber sales would also increase the percentage of western white pine and western larch in stands that are retained or regenerated from the harvesting that has taken place or is proposed. The effect of Alternatives B and C on reducing bark beetle populations and future incidence of root rot would be in addition to effects of the aforementioned sales, which were designed to accomplish the same goals. All of these timber sale projects will expose mineral soil and, potentially, increase the risk of noxious weed occurrence in the analysis area. Mitigation measures to reduce any increase in noxious weed establishment have been designed and partially implemented for all of these projects. The mitigation measures in conjunction with a recently initiated weed management program may reduce the occurrence of noxious weeds over time.
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RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS: Is there substantial use of the area by important wildlife, birds or fish? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] Existing Environment: The wildfire that burned in this area reconstructed a habitat that is underrepresented on today's landscape. Wildfire killed and weakened trees, consumed understory vegetation, and opened up the tree canopy. These conditions provide habitat for early seral wildlife species and species that require burned or weakened trees for foraging and nesting. The analysis area for fisheries is the Cyclone Creek watershed. Cyclone Creek is a third-order tributary to Coal Creek. The creeks in the proposed project area are small tributaries to Cyclone Lake and are not large enough to support fish populations. Big game species include elk, white-tailed deer, and mule deer. No winter ranges occur within the fire area; therefore, big game species were dropped from further analysis. Direct and Indirect Effects: No-Action Alternative A - Increased foraging and nesting sites for insectivorous and cavity-nesting wildlife species would be retained. A variety of burned habitats will be retained on the landscape. No direct or indirect effects to fish populations would occur. Action Alternatives B and C - With the proposed harvesting, the majority of fire-killed or stressed shade-tolerant trees would be removed. The harvest would remove some of the trees that could provide structure in a future stand. Some of the variety of the burned habitat within the fire would be lost. Approximately 8 medium to large snags, snag recruits, and seedtrees per acre would be left, providing for foraging and nesting habitats. However, the habitat quality for insectivorous and cavity-nesting species would be reduced in harvested stands. No direct or indirect effects to fish or fish populations would occur beyond those currently occurring. Fish do not inhabit the creeks in the project area. No spawning activity occurs in Cyclone Lake where the project area creeks meet the lake. Cumulative Effects: No-Action Alternative A - DNRC would retain the full variety of burned habitat created by the fire on the site. Snags and snag-recruitment trees would be retained at the maximum amount. Wildlife species that use snags and/or burned forest habitat would benefit in the short term, while species that use snags and/or down woody material would benefit in the longer term as these snags fall to the ground. Fish habitat and populations would not be altered by this action. Action Alternatives B and C - The number of snags, snag recruits, and downed and future down woody material would be reduced. Overall, wildlife species that use cavities, downed woody debris, forested habitats, and/or prey on forest insects might be impacted. No cumulative effects to fish populations or fish spawning habitat would occur.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES: Are any federally listed threatened or endangered species or identified habitat present? Any wetlands? Sensitive Species or Species of special concern? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] Existing Environment: Four species indigenous to northwest Montana are classified as threatened or endangered under the Endangered Species Act of 1973. The bald eagle, Canada lynx, and grizzly bear are listed as threatened, while the wolf is listed as endangered. Suitable habitat for these species occurs in or near the project area. The area where the fire occurred does not appear to be high quality grizzly bear summer habitat. Four species, the black-backed woodpecker, boreal owl, fisher, and pileated woodpecker, are listed as sensitive species and are analysed for this project. Field reconnaissance determined that the boreal owl habitat in the project area was removed by the fire; therefore, this species was not further analysed. Direct Effects: No-Action Alternative A - Under No-Action Alternative A, no change is expected in the direct effects to bald eagles, Canada lynx, Northern Rocky Mountain wolf, black-backed woodpeckers, fishers, or pileated woodpeckers. The amount of disturbance to grizzly bears would revert to conditions prior to the fire. Action Alternatives B and C - Bald eagle flight paths may be disrupted, although Alternative B would have a longer duration of disturbance. However, since all operations are ground based, the bald eagle disruption is expected to be negligible. No direct effects to Canada lynx are expected. Grizzly bear use of the area is unknown, but effects are expected to be negligible; although negligible, Action Alternative B would be expected to result in more displacement and increased energetic costs than Action Alternative C. No effects to the Northern Rocky Mountain Wolf are expected. No effects to fisher habitat are expected. Pileated woodpeckers might be displaced; however, the effects of harvesting are unknown, but are not expected to be measurable. Indirect Effects: No-Action Alternative A - Since no alternative affects any area used substantially by eagles, no indirect effects are expected. Under No-Action Alternative A, Canada lynx foraging habitat is expected to develop slower than under Action Alternatives B and C. No increase in mortality risk to lynx is expected under any alternative. Hiding cover for grizzly bears is not expected to change. The maximum amount of black-backed woodpecker habitat available would be retained. For pileated woodpecker habitat, this alternative is expected to result in negligible effects in the short-term and may be positive or negative in the distant future, depending on the species mix that regenerates. Action Alternatives B and C - Since no alternative affects any area used substantially by eagles, no indirect effects are expected. The planting of seedlings, as prescribed, is expected to accelerate the development of snowshoe hare habitat. The removal of the burned trees might reduce the downed material in the future stand. Hiding cover under these alternatives would be expected to develop in a shorter time period. Habitat for black-backed woodpeckers would be reduced by 100 acres (62 percent). Since newly burned areas are a rare habitat in this area, the reduction might inhibit black-backed woodpeckers from using the area. Foraging habitat for pileated woodpeckers would not be reduced further than current conditions; though some feeding sites would be lost, effects are expected to be minimal. Cumulative Effects: No-Action Alternative A - No cumulative effects to eagles would be expected. Foraging habitat for Canada lynx would increase over time, this would be in addition to the increases expected due to the Cyclone/Coal '99 and 2000 timber sales. No measurable effect to grizzly bear is expected. Action Alternative B and C - The effects of this project to eagles might add to the effects expected from the Cyclone/Coal 2000 Timber Sale; harvesting on Winona Ridge would occur after the eaglet fledging (August 1). If both projects occur concurrently, 2 of 3 flight patterns would include timber-harvesting activities; however, the proposed harvesting is not expected to disrupt eagles substantially. Therefore, the cumulative effects are expected to be negligibly higher, but similar to the effects described for the Cyclone/Coal 2000 Timber Sale. Canada lynx foraging habitat would increase over time; this increase would be in addition to the increases expected due to the Cyclone/Coal '99 and 2000 timber sales. For grizzly bear habitat under Action Alternative C, no increase in the percent of open roads would occur; displacement would occur from the percent of total roads and the reduction in security core. Under Action Alternative B, the amount of area that bears would avoid would increase by 603 acres due to the open-road densities. There are 3 options that could be chosen in reference to mitigation for the reduction of grizzly core habitat for Action Alternatives B and C, these are explained in detail in the <i>WILDLIFE ANALYSIS, APPENDIX F</i>, pages 6 and 7.
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10. HISTORICAL AND ARCHAEOLOGICAL SITES: Are any historical, archaeological or paleontological resources present?	[N] The proposed project area has no known cultural/archaeological resources.
11. AESTHETICS: Is the project on a prominent topographic feature? Will it be visible from populated or scenic areas? Will there be excessive noise or light? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] <i>Existing Environment:</i> The project is located on a north-facing slope; a background view can be seen from Cyclone Lake and a foreground view from Road 909. The hillside includes a mosaic of mature mixed-conifer stands, regenerating western larch/Douglas-fir stands, and areas that are burned completely, partially burned, and where firelines were constructed with dozers and excavators. Some firelines were recontoured and the topsoil and vegetation that was removed during line building was spread back on the fireline; water bars were installed to reduce the risk of erosion. The firelines have been rehabilitated by spreading slash, logs, and debris on them. Spreading vegetation on the firelines has reduced the visual impact of exposed mineral soil. <i>Direct and Indirect Effects:</i> No-Action Alternative A - No direct effects to the existing aesthetic values would occur; however, over time many of the trees would fall, so a close foreground view would continue to show large concentrations of burnt timber on the ground. This would increase gradually over time. From a middleground view, the area would maintain many burnt snags and, with the exception of existing roads and firelines, would resemble a typical wildfire disturbance. Action Alternatives B and C - A large percentage of the burnt timber would be removed, which would open up the foreground view. A large portion of the down trees would be removed, although there would be some concentrated and scattered trees visible throughout the project area. Approximately 8 larger trees per acre would be retained. These trees are not evenly distributed, so openings will be produced. Travels along Road 909 would have increased views up the slope through the fire area when harvesting is completed. Many trees and clumps of timber did not burn in the fire along Road 909; most of these trees would be retained to partially block the view of the fire area; the view in some areas would be blocked completely. Two temporary spur roads may need to be constructed for harvesting (0.5 miles total, approximately). After these roads have been reclaimed and revegetated, they would be less visible. Throughout harvesting, middleground views (from Cyclone Lake) would show more openings with scattered leave trees, concentrations of unmerchantable burnt trees, and pockets of unburned areas that would break up openings. <i>Cumulative Effects:</i> Common to All Alternatives - Currently, there are a mosaic of timber stands that have developed from natural disturbances, timber stands that have been established through harvesting, and roads and manmade structures, such as gates, signs, parking areas and lookouts, in the various views of the area. Recently harvested units with openings, logging slash, fresh skid trails, and landings are visible from the Coal Creek and North Fork roads and have not yet regenerated. The proposed logging in the Cyclone/Coal 2000 Timber Sale would create additional openings; however, proposed treatments would include a heavy overstory retention and irregular boundaries. Impacts to aesthetic values from implementing any of the Cyclone Ridge Salvage alternatives would be in addition to these current and proposed additions to the viewshed.
12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY: Will the project use resources that are limited in the area? Are there other activities nearby that will affect the project? Are cumulative impacts likely to occur as a result of this proposed action?	[N]

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA: Are there other studies, plans or projects on this tract? Are cumulative impacts likely to occur as a result of other private, state or federal current actions w/n the analysis area, or from future proposed state actions that are under MEPA review (scoping) or permitting review by any state agency w/n the analysis area?	[Y] The Cyclone/Coal EIS, published in 1998, was considered in the cumulative effects analysis
III. IMPACTS ON THE HUMAN POPULATION	
RESOURCE	[Y/N] POTENTIAL IMPACTS AND MITIGATION MEASURES
14. HUMAN HEALTH AND SAFETY: Will this project add to health and safety risks in the area?	[N]
15. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION: Will the project add to or alter these activities?	[N]
16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT: Will the project create, move or eliminate jobs? If so estimated number. Are cumulative impacts likely to occur as a result of this proposed action?	[N] People are currently employed in the wood product industries in the region. Due to the relatively small size of the timber sale program, no measurable cumulative impact on employment would be expected from this proposed action.
17. LOCAL AND STATE TAX BASE AND TAX REVENUES: Will the project create or eliminate tax revenue? Are cumulative impacts likely to occur as a result of this proposed action?	[N] People are currently paying taxes from the wood product industries in the region. Due to the relatively small size of the timber sale program, no measurable cumulative impact on tax revenues would be expected from this proposed action.

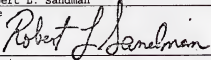
18. DEMAND FOR GOVERNMENT SERVICES: Will substantial traffic be added to existing roads? Will other services (fire protection, police, schools, etc) be needed? Are cumulative impacts likely to occur as a result of this proposed action?	[N] No measurable cumulative impacts related to demand for government services would be expected due to the relatively small size of the timber sale program, the short-term impacts to traffic, the small possibility of a few people temporarily relocating to the area, and the lack of other timber sales in the adjacent area.
19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: Are there State, County, City, USFS, BLM, Tribal, etc. zoning or management plans in effect?	[Y] In June 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan (Plan). The management direction provided in the Plan comprises the framework within which specific project planning and activities take place. The Plan philosophy and appropriate Resource Management Standards have been incorporated into the design of the proposed action.
20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES: Are wilderness or recreational areas nearby or accessed through this tract? Is there recreational potential within the tract? Are cumulative impacts likely to occur as a result of this proposed action?	[Y] <i>Existing Condition:</i> The area where harvesting activities are proposed is not adjacent to designated wilderness. Dispersed recreation, such as firewood gathering, berry picking, hunting, and hiking, take place in and around the project area. The road that accesses most of the project area is currently restricted and was closed and revegetated prior to the fire. The project area is located on steep terrain with thick undergrowth and concentrations of blowdown, which has kept recreational use to a very low level in the past. <i>Direct and Indirect Effects:</i> No-Action Alternative A - Currently the fire area has large concentrations of downed trees; this condition would persist for a long period of time, and, as burnt trees fall, this condition would actually be compounded. No additional effect to vehicle traffic would occur. Action Alternatives B and C - Proposed harvesting would remove burnt standing trees and a large portion of the fallen trees, which would make the area easier to access and safer to use by hikers, hunters, and berry pickers. Road 909 may have brief temporary closures to allow for safely felling trees at the bottom of the project area. <i>Cumulative Effects:</i> Increased population is occurring in Northwest Montana and, subsequently, an increase in dispersed recreation. When the area can be accessed by an open road, recreational use will likely increase over time, regardless of whether salvage harvesting takes place.
21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING: Will the project add to the population and require additional housing? Are cumulative impacts likely to occur as a result of this proposed action?	[N] No measurable cumulative impacts related to population and housing would be expected due to the relatively small size of the timber sale program and the fact that people are already employed in this occupation in the region.
22. SOCIAL STRUCTURES AND MORES: Is some disruption of native or traditional lifestyles or communities possible?	[N]
23. CULTURAL UNIQUENESS AND DIVERSITY: Will the action cause a shift in some unique quality of the area?	[N]

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES: Is there a potential for other future uses for easement area other than for timber management? Is future use hypothetical? What is the estimated return to the trust. Are cumulative impacts likely to occur as a result of this proposed action?	[Y] Cost and revenues are presented for the relative comparison of the alternatives and are not intended as absolute values of return to the school trust. For methods and further discussion see <i>ECONOMICS ANALYSIS, APPENDIX E</i>. Existing Condition: The log market in Northwest Montana is low and prices are expected to remain low further into this year. The condition of the burnt timber is considered salvageable at this time, but will lose its value for wood products in the near future. Direct and Indirect Effects: No-Action Alternative A - Project-area revenue would not change from the existing condition. The burned trees would lose value for wood products and the opportunity to capture that value would be lost Action Alternatives B and C - Approximately \$86,086 would be deposited in the school trust accounts, \$49,428 into the DNRC Forest Improvement (FI) account, and \$7,824 worth of road improvement would be accomplished. Alternative C may bring a lower bid, which would reduce the income to the State, or up to 30 percent less volume may be harvested, which would reduce the total timber revenue to the State by \$40,654. With the implementation of Action Alternative B, the cost of reforestation would be \$5,541; with the implementation of Action Alternative C, reforestation would cost between \$3,889 and \$5,541. Cumulative Effects: No-Action Alternative A - No change to the local economy would be expected provided a local mill purchases a substituted amount of timber. Lack of a viable substitution could result in a negative effect on DNRC's cash flow and the local economy. Action Alternatives B and C - If implemented, a local mill would likely purchase this timber sale; the local economy would benefit from the availability of the stumpage sold.
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EA Checklist Prepared By:	<u>Brian Manning</u>	<u>Forest Management Specialist</u>	<u>1/16/01</u>
	Name	Title	Date
	<u>Norm Merz</u>	<u>Wildlife Biologist</u>	
	<u>Tony Nelson</u>	<u>Hydrologist</u>	

IV. FINDING

25. ALTERNATIVE SELECTED:	See enclosed Finding.
26. SIGNIFICANCE OF POTENTIAL IMPACTS:	
27. Need for Further Environmental Analysis: ☐ EIS ☐ More Detailed EA ☒ No Further Analysis	

EA Checklist Approved By:	<u>Robert L. Sandman</u>	<u>Stillwater Unit Manager</u>
	Name	Title
		
	Signature	<u>February 2, 2001</u>
		Date

CYCLONE RIDGE FIRE TIMBER SALVAGE ENVIRONMENTAL ASSESSMENT CHECKLIST

STIPULATIONS AND SPECIFICATIONS APPENDIX A

Stipulations and specifications for the action alternatives were identified or designed to prevent or reduce potential effects to resources considered in this analysis. In part, stipulations and specifications are a direct result of issue identification and resource concerns. This section is organized by resource.

Stipulations and specifications that apply to operations required by and occurring during the contract period would be contained within the timber sale contract; as such, they are binding and enforceable. Project administrators would enforce stipulations and specifications relating to activities, such as hazard reduction, site preparation, and planting, that may occur during or after the contract period.

The following stipulations and specifications are incorporated to mitigate effects on resources involved with the action alternatives considered in this proposal.

WATERSHED AND FISHERIES

- Erosion-control measures planned include:
 - grade breaks on roads,
 - surface-water-diverting mechanisms on roads,
 - slash-filter windrows, and

- grass seeding.

Details for these control measures will be included in Appendix B of the Timber Sale Agreement

- Streamside Management Zones (SMZs) will be defined where they occur within or adjacent to harvest areas. This will be done to protect areas adjacent to streams to maintain water quality.
- Leaking equipment would not be permitted to operate in stream-crossing construction sites.

Included in the project proposal are the following pertinent recommendations of the Flathead Basin Forest Practices, Water Quality and Fisheries Cooperative Program Final Report, June 1991.

The following numbers correspond to the numbering of recommendation items contained within the aforementioned document, included in pages 154-162 of the Final Report.

1. BMPs are incorporated into the project design and operations of the proposed project.
2. Riparian indicators will be considered in the harvest unit layout.
3. Management standards of the SMZ Law (75-5-301 Montana Codes Annotated [MCA]) are used in conjunction with the

recommendations of the study.

4. The BMP audit process will continue. This sale will likely be reviewed in an internal audit and may be picked at random as a Statewide audit site.
7. SMZs will be evaluated as a part of the audit process.
15. DNRC will use the best methods available for logging and road building for this proposal.
- 16A. Existing roads are fully utilized for this proposal.
18. Provisions in the Timber Sale Agreement address BMPs that are rigidly enforced.
- 29-34. DNRC has cooperated with DFWP to continue fisheries work. DNRC will continue to monitor fisheries in the future as funding allows.

GRIZZLY BEARS

The following items are incorporated into this proposal:

- No logging camps would be allowed in the sale area.
- Garbage hauling would be required daily.
- The Forest Officer would immediately suspend any or all activities directly related to the proposed action, if necessary, to prevent imminent confrontation or conflict between grizzly bears, or other threatened or endangered species, and humans.
- While working under contract, contractors will be prohibited from carrying firearms onto restricted roads.
- Harvesting activities behind the restricted road that accesses the sale area will be limited to

either a 30-consecutive day period during the summer season or one entire summer season between July 1 and September 15, depending on the alternative chosen.

- The gate will be locked when the sale is inactive.

WOLVES

A contract provision will protect any wolf den or rendezvous site within the gross sale area discovered during implementation of this proposal.

SNAG RETENTION

- High-quality wildlife trees, such as large, broken-topped western larch, will be designated for retention and given special consideration during yarding operations to prevent loss.
- Snag retention and recruitment guidance (9/97) would be met utilizing standards for cool/moist habitat types. All snags will be retained that are safe to operate around. Approximately 8 of the larger trees per acre, preferably greater than 21 inches dbh, will be retained for future snag recruitment.
- Black cottonwood, western larch, Douglas-fir, and grand fir will be favored for snag recruitment (listed in order of species preference).

BALD EAGLE

- No harvesting within .5 mile of the nest between February 15 and August 15.
- No road maintenance within .25 mile of the nest between February 15 and August 15.

FISHER

- A buffer of 25 meters or greater will be retained along the intermittent streams in the harvest area. Most of the canopy will be retained in these buffers.

BLACK-BACKED WOODPECKER

- Approximately 63 acres of black-backed woodpecker habitat within the fire area would not be harvested.

ROADS

- Road reconstruction activities and road use associated with road construction activities will be relayed to the general public.
- Best management practices (BMPs) will be incorporated into all planned road construction.

AESTHETICS

- Damaged residual vegetation will be slashed.
- The number and size of landings will be limited; the location will be away from main roads, when possible.
- Disturbed sites along road right-of-ways will be grass seeded.

AIR QUALITY

Dust abatement may be applied on some segments of the Coal Creek Road during hauling, depending on the season and level of public traffic.

SOILS

COMPACTION

- Logging equipment will not operate off forest roads unless soil moisture is less than 20

percent, frozen to a depth that will support machine operations, or snow covered to a depth that will prevent compaction, rutting, or displacement.

- Existing skid trails and landings will be used if their design is consistent with prescribed treatments and meets current BMP guidelines.
- Designated skid trails would be required where moist soils or short steep pitches (less than 300 feet) would not be accessed by other logging systems. This would reduce the number of skid trails and the potential for erosion.
- The logging foreman and sale administrator will agree to a general skidding plan prior to equipment operations.
- The density of skid trails in a harvest area will not exceed 20 percent of the total area in a cutting unit.

SOIL DISPLACEMENT

Conventional ground-based skidding equipment will not operate on sustained slopes steeper than 40 percent. Cable yarding would be used on steeper slopes.

EROSION

- Ground-skidding machinery will be equipped with a winchline to limit equipment operation on steeper slopes.
- Roads used by the purchaser will be reshaped and the ditches redefined following use to reduce surface erosion.
- Drain dips and gravel will be installed on roads, as needed, to improve road drainage and reduce maintenance needs and erosion.
- Some sections of road will be repaired to upgrade the roads to design standards that reduce erosion potential and maintenance

needs.

- The prompt and timely application of certified weed-free grass seed and fertilizer would be applied to all newly constructed road surfaces and cut-and-fill slopes and to any existing disturbed cut-and-fill slopes and landings immediately adjacent to open roads. This would be done to stabilize soils and reduce or prevent the establishment of noxious weeds and would include:
 - seeding all road cuts and fills concurrently with construction;
 - applying "quick cover" seed mix at culvert installation sites within 1 day of when work is completed; and
 - seeding all road surfaces and culvert installation sites when the final blading is completed for each specified road segment.
- As directed by the Forest Officer, water bars and logging slash barriers will be installed on skid trails where there is a potential for erosion, based on ground and weather conditions. These erosion-control features will be periodically inspected and maintained throughout the contract period or extensions thereof.
- Approximately 12 to 18 tons per acre of coarse woody debris will be retained on site to reduce erosion and provide for nutrient recycling.

NOXIOUS WEED MANAGEMENT

- Surface blading may be required to remove weeds before the seed-set stage on roads affected by the proposal.
- All tracked and wheeled equipment are required to be clean of noxious weeds prior to beginning project operations. The contract-administrating officer will inspect equipment periodically during project implementation.
- Prompt revegetation of disturbed roadside sites would be required. Roads used and closed as part of this proposal would be reshaped and seeded.
- Herbicide treatment of the restricted road system will take place in conjunction with other weed monitoring and site specific herbicide application taking place on Coal creek State Forest

ARCHAEOLOGY

A contract clause provides for suspending operations if cultural resources are discovered; operations may only resume as directed by the Forest Officer.

CYCLONE RIDGE FIRE TIMBER SALVAGE
ENVIRONMENTAL ASSESSMENT CHECKLIST
OVERVIEW
APPENDIX B

FIRE OVERVIEW

The Cyclone Ridge Fire, lightning caused, was detected on August 26, 2000. Fire suppression crews continued their containment and control efforts into September. To gain access to the fire, the road system that was built with the Cyclone Lake Timber Sale in the late 1960s was opened. The road, which had been closed with an earthen berm, has had segments with brush growing into the road for many years. Since the fire, a gate has been installed near the location of the previous closure to restrict access. The area within the fire perimeter is 200 acres, approximately.

The fire occurred towards the end of the very busy 2000 fire season when manpower and fire suppression equipment was mostly unavailable. For the most part, the fire burned intensely in heavy fuels, creating a mosaic where approximately 85 percent of the area burned hot enough in the mature timber stands to cause complete mortality. Small pockets of mature timber survived and scattered large Douglas-fir and a few western larch may survive. Due to lack of available fire crews, a large percentage of the fireline was constructed using an excavator and dozers. Fireline rehabilitation work, such as spreading slash, logs, and debris, has since been done. In some cases, firelines were

recontoured and topsoil and vegetation, which were removed during line building, was spread on them. Water bars were installed on the fireline to reduce the risk of erosion. Prior to closure, the road was graded to smooth ruts and improve surface drainage.

PROPOSED SALVAGE TIMBER SALE

OBJECTIVES:

- Sell a salvage timber sale to capture the value of burned timber for the school trusts.
- Reestablish a vigorous young stand of trees by planting western larch and rust-resistant western white pine seedlings within the fire perimeter where salvaging takes place and openings have been created.
- Install surface drainage on the road system to prevent erosion and lower the risk of long-term maintenance problems on a closed system.

ACTIONS PROPOSED:

- Harvest timber over approximately 104 acres within the fire perimeter.
- Harvest approximately 28 acres using conventional ground-based equipment in combination with winchline skidding.

- Harvest approximately 76 acres using a combination of ground-based equipment and skyline yarding.
- Construct approximately .50 miles of temporary roads, if needed, to facilitate log yarding; the temporary roads will be built with minimum cut and fill.
- Reclaim the temporary roads following harvesting activities by spreading slash, coarse woody debris, topsoil, and vegetation that was removed during construction.
- Install water bars on the road surface, as needed, to prevent erosion.
- Following logging activities, plant the salvaged area.
- Close the road system that accesses the area off the 909 Road (a short segment near the intersection with the 909 road will be reclaimed to discourage motorized breach of the gate).
- Harvesting activities behind the restricted road system accessing the fire would be limited to protect grizzly habitat to either 30 consecutive days during the summer season or for the entire summer season, all in 2001. The summer season for grizzly habitat is considered to be between July 1 and September 15.

SILVICULTURAL TREATMENT PROPOSED:

Most of the merchantable timber within the proposed harvest area would be salvaged (see Harvest Map-back of front cover). Alive and dead trees will be retained:

- in small pockets where the intensity of the fire was not as great and mortality was less,
- in streamside management zones located along the intermittent streams, and
- where there are scattered large-diameter Douglas-fir and western larch.

The large-diameter western larch and Douglas-fir would be retained to provide seed and provide snag habitat. A portion of burned area near the southwestern corner of the fire would be retained as habitat for black-backed woodpeckers. Western larch and rust-resistant western white pine would be planted at approximately a 14-foot-by-14-foot spacing following harvesting. Follow-up treatments would include:

- surveying the regeneration approximately 5 years after planting;
- monitoring the area approximately 15 years after harvesting to determine precommercial thinning needs; and
- monitoring the planted rust-resistant white pine to determine whether pruning is needed to prevent rust infection.

CYCLONE RIDGE FIRE TIMBER SALVAGE
ENVIRONMENTAL ASSESSMENT CHECKLIST
SUMMARY OF CONCERNS
RECEIVED FROM
INITIAL SCOPING
APPENDIX C

The following concerns, received during a 30-day comment period that began in October 2000, are summarized by resource.

WILDLIFE

- Concern was expressed that disturbance from harvesting operations and utilization of the access roads for the proposed salvage would negatively affect the core habitats of certain wildlife species, such as grizzly bears and Canadian Lynx.
- Concern was expressed that old-growth-associated species, such as pileated woodpeckers, martins, goshawks, and fishers, may be negatively affected by the proposed salvage.
- One person expressed concern that a pair of bald eagles known to use Cyclone Lake be considered in the analysis and that valuable snags be retained for them.
- Concern was expressed that salvaging the burnt timber would lose some of the habitat values created by the fire, such as structural diversity, snag habitat, and increased insect activity.

VEGETATION

- A person questioned whether current or future old-growth stands on Coal creek State Forest would be affected.
- Concern about the spread of noxious weeds was voiced.
- The effects of grass seeding on native plant species were a concern.
- An expressed concern was that the proposed harvesting would reduce the amount of nutrients on site and disrupt the natural processes associated with plant succession after wildfires have occurred. The special habitat that is created along the edges of large fires should be retained to provide for mushrooms.
- Concern was expressed that rehabilitation options, including tree planting, would be limited without first harvesting some of the dead and down timber. Concern was also expressed that without harvesting the dead and down trees, insect buildups would have an adverse effect on adjacent timber stands, thus increasing fire hazards in the area.

SOILS AND WATER QUALITY

Concern was received about the negative effects to the soil resource from potential compaction, displacement, erosion, and loss of productivity. Concerns about the effects to water quality and native fisheries, particularly the bull trout, were also received.

ECONOMICS

- Several respondents voiced a concern that, if the timber were not salvaged, a loss of income to the school trusts would result.
- If salvage does not occur in the near future, the value of the logs for wood products would be severely reduced or lost was another concern.
- Concern was expressed that burnt timber should not be salvaged on land that was not suitable for long-term timber management.

- Concern was expressed that excessive restrictions would be placed on the proposed salvage harvesting and would cause a loss of value to the State and an increase in risk to potential purchasers.
- Several respondents thought that limiting harvesting activities to 30 consecutive days was too restrictive and would affect the economic feasibility of the project.
- Concern was voiced that the project is not economically feasible given that the market for stumpage is down from recent years.

OTHER COMMENTS

- One commenter suggested that the salvage contractor complete the fire rehabilitation work.
- Another person observed that the salvage harvest should count toward DNRC's annual harvest target.

CYCLONE RIDGE FIRE TIMBER SALVAGE
ENVIRONMENTAL ASSESSMENT CHECKLIST
VEGETATION
ANALYSIS
APPENDIX D

INTRODUCTION

This summary includes information about the existing condition and effects of the proposed alternatives on vegetation. The format is organized to present the existing condition in reference to the particular element of the resource being analyzed, followed by the direct, indirect, and cumulative effects of the 3 alternatives being considered.

METHODS

The proposed action being analyzed is the salvage of timber within an area burned by a wildfire. Many of the changes to vegetation have already occurred on the site; therefore, the analysis will briefly discuss conditions prior to the fire and concentrate, primarily, on the changes that would occur by implementing either the no-action or action (salvage) alternatives. The scales of analysis will include:

- the fire perimeter,
- the entire Coal Creek State Forest (approximately 15,094 forested acres), and
- for historic conditions, data from Losensky's climatic section 333c, which represents the Upper Flathead Valley (Losensky 1997).

The analysis will include an examination of existing conditions

and projected effects for age classes, cover types, old growth, insect and disease mortality, noxious weeds, and sensitive plants.

PROJECT AREA

The Cyclone Ridge Fire occurred on a north-facing slope of Coal Ridge, approximately 0.5 mile south of Cyclone Lake within Coal Creek State Forest. The fire perimeter, approximately 200 acres, runs from approximately 4,520 to 5,520 feet in elevation. The habitat type was predominantly subalpine fir/fool's huckleberry (ABLA/MEFE), with some small inclusions of subalpine fir/devil's club (ABLA/OPHO). These habitats indicate a cool moist or cool wet site with moderate to high timber productivity capability. Approximately 21 percent of Coal Creek State Forest has similar habitat types. A road system has accessed the area within the fire perimeter since the late 1960s; stands harvested during that time period are located to and within the fire perimeter and now consist of advanced regeneration.

FOREST COVER TYPES

EXISTING CONDITION

TABLE D-1 - COVER TYPE DISTRIBUTION IN COAL CREEK STATE FOREST, THE FIRE PERIMETER PRIOR TO FIRE, AND LOSENSKY'S CLIMATIC SECTION 333C

COVER TYPE	ACRES OF COVER TYPE IN COAL CREEK STATE FOREST (INVENTORY OF 1930s)	ACRES OF COVER TYPE IN COAL CREEK STATE FOREST (CURRENT INVENTORY)	ACRES OF COVER TYPE IN THE FIRE PERIMETER (CURRENT INVENTORY PRIOR TO FIRE)
Subalpine fir	3,053	3,899	173
Douglas-fir	638	1,253	0
Lodgepole pine	7,119	3,801	0
Mixed conifer	2,421	3,671	17
Nonstocked	272	75	0
Western larch/Douglas-fir	1,806	1,813	1
Western white pine	60	581	7
Totals	15,370	15,094	198

EFFECTS TO COVER TYPES

Direct Effects

• *Direct Effects of No-Action Alternative A*

Most shade-tolerant species within the fire perimeter, such as subalpine fir, were killed or are likely to die in the near future. Subsequently, the cover type may have changed to a western larch/Douglas-fir cover type for the short term.

• *Direct Effects of Action Alternatives B and C*

Action Alternatives B and C propose to plant western larch and rust-resistant western white pine in the area where harvesting occurs. The cover type would be converted to a western larch/Douglas-fir or, potentially, a western white pine cover type, depending on the long-term survival of planted stock. This would occur on 104 acres, approximately, for Action Alternative B; this may occur on a reduced number of acres (up to 27

acres less) for Action Alternative C.

Indirect Effects

• *Indirect Effects of No-Action Alternative A*

Except for some small pockets and areas of draw bottoms, the fire burned with a high to moderately high intensity over all of the fire area. The fire killed most of the overstory; only a few scattered western larch and Douglas-fir that could, potentially, produce seed for regeneration will remain in the burned area. Western white pine was very scattered in the burned project area; those trees were either killed by the fire or attacked by mountain pine beetles (*Dendroctonus ponderosa*) after the fire. Mature forests that include all of the aforementioned species are adjacent to some portions of the fire perimeter and may provide a seed source for natural regeneration. The available seed source would be limited in the interior and in portions where the

perimeter is adjacent to young stands. Given this situation, the area within the fire perimeter will likely regenerate into a western larch/Douglas-fir or subalpine cover type over time. If a natural establishment of young trees is not achieved in a short period of time on this north-facing slope, shrub competition is likely to occupy large portions of the area; those areas would be nonstocked in reference to cover type.

• *Indirect Effects of Action Alternatives B and C*

Since planting would occur over most of the area that is opened up from harvesting, seedlings would become established prior to the establishment of extensive shrub competition, which would provide the young trees a better chance of occupying the area in the near future. Rust-resistant western white pine that is planted will have a better chance of surviving over the long term, and more western white pine will make up the species mix of the mature stand that regenerates. Scarification that occurs during the harvesting process and opening up the burned canopy will provide a better seedbed for shade-intolerant species, such as western larch, that seed naturally in the area. Alternative C may have these effects over a reduced number of acres (up to 27 acres less).

Cumulative Effects

• *Cumulative Effects of No-Action Alternative A*

The changes in cover type that have occurred because of the fire are in addition to the changes that have occurred from timber harvesting in the Cyclone/Coal '99 Timber Sale. This sale converted

approximately 364 acres to a western larch/Douglas-fir cover type. The Cyclone/Coal 2000 Timber Sale may be initiated in the near future; an additional 282 acres would be converted from a mixed-conifer cover type to a western larch/Douglas-fir cover type.

• *Cumulative Effects of Action Alternatives B and C*

The changes that have occurred because of the fire are in addition to the changes in cover type that have occurred from harvesting the Cyclone/Coal '99 Timber Sale. This sale converted approximately 364 acres to a western larch/Douglas-fir cover type. The Cyclone/Coal 2000 Timber Sale may be initiated in the near future; if that occurs, an additional 282 acres would be converted from a mixed-conifer cover type to a western larch/Douglas-fir cover type. Alternative C may have these effects over a reduced number of acres (up to 27 acres less).

AGE CLASS DISTRIBUTION

EXISTING CONDITION

Figure C-1 (following page) shows the area that is occupied by each age class in the 3 analysis areas. The distribution of age classes within the fire perimeter was prior to the fire.

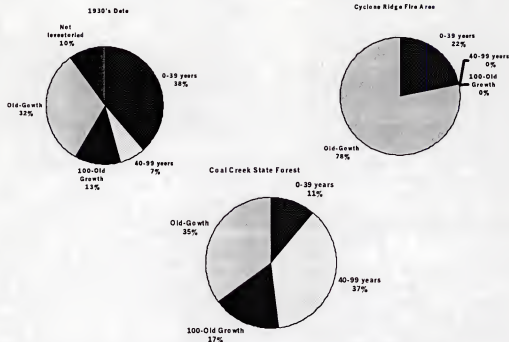
EFFECTS TO AGE CLASS

Direct Effects

• *Direct Effects of No-Action Alternative A*

No-Action Alternative A would have no direct effects on the age class distribution within the fire perimeter. The age class would be considered nonstocked over most of the area until natural regeneration occurs and the age

FIGURE D-1—AREA OCCUPIED BY EACH AGE CLASS IN THE 3 ANALYSIS AREAS



class becomes a 0-to-39-year-old stand.

• **Direct Effects of Action Alternatives B and C**

Action Alternative B and C would have no direct effect on the age-class distribution within the fire perimeter. The age class would be considered nonstocked over most of the area until natural regeneration and planting occurred; the stand would then become a 0-to-39-year age class.

Indirect Effects

• **Indirect Effects of No-Action Alternative A**

Given no tree planting would occur and the seed sources are scarce within the fire perimeter, the area may take longer to become stocked with seedlings; some of the area may remain nonstocked for an extended period of time due to shrub competition.

• **Indirect Effects of Action Alternatives B and C**

Action Alternative B proposes planting seedlings in the area where the tree canopy had been removed through salvage harvesting, fire suppression efforts, or burning in the fire. Planting trees could change the area from nonstocked to a 0-to-39-year age class sooner than might occur with natural regeneration. Both natural regeneration and the planted seedlings will likely establish in the area under this alternative; therefore, the risk of shrub competition delaying the area becoming stocked with trees would be reduced. Alternative C may have these effects over a reduced number of acres (up to 27 acres less).

Cumulative Effects

• **Cumulative Effects of No-Action Alternative A**

Effects to age class with No-Action Alternative A would be in

addition to the changes that occurred with the Cyclone/Coal '99 Timber Sale. With this sale, approximately 180 acres in the 40-to-99-year age class and 12 acres in the 150+ age class were harvested with regeneration cuts; they will revert to the 0-to-39-year age class with the establishment of new trees in the next several years. The Cyclone/Coal 2000 Timber Sale may be initiated in the near future. If that occurs, harvesting would open up the canopy enough so that the regeneration of shade-intolerant species could occur; however, enough overstory would be retained so that the age class of the stand, as a whole, would not change.

• **Cumulative Effects of Action Alternatives B and C**

Effects to age class with Action Alternatives B and C would be in addition to the changes that occurred with the Cyclone/Coal '99 Timber Sale. With this sale, approximately 180 acres in the 40-to-99-year age class and 12 acres in the 150+ age class were harvested with regeneration cuts; these areas will be in the 0-to-39-year age class with the establishment of new trees over the next several years. The Cyclone/Coal 2000 Timber Sale may be initiated in the near future. If that occurs, harvesting would open up the canopy of timber stands enough so that the regeneration of shade-intolerant species could occur; however, enough overstory would be retained so that the stand age class, as a whole, would not change.

OLD GROWTH

The State forest Land Management Plan (SFLMP) states that DNRC will seek to maintain or restore old-growth forests in amounts of at least half the average proportion,

which would be expected to occur with natural processes on similar sites (Montana DNRC 1996). Old growth must be retained not only in the amounts committed to, but also in appropriate proportions and sites across the landscape. The Biodiversity Guidance adopted in May 1998 is the current guidance for managing for biodiversity and old growth on State lands. This guidance replaces methods used previous to the implementation of the SFLMP (1996). This is described in Supplemental Biodiversity Guidance: Old Growth Management Strategies and Definitions (December 1999):

When developing the SFLMP, Remington's paper, Biological Diversity Strategies for Forest Type Groups, was included as an example of how DNRC might manage for biodiversity under the SFLMP. Remington's paper was not intended to be prescriptive, but was solely meant to be an example of some of the concepts we would consider in meeting our biodiversity commitments. In particular, the Strategies for Specific Forest Type Groups provides generalized statements regarding ecological considerations that may be important in determining appropriate treatments in the various forest type groups. The paper was never intended to provide cookbook approaches to meeting our commitments, especially given that portions are contradictory to SFLMP direction and intent.

Biodiversity RMS 7 in the SFLMP states, "Biological Diversity Strategies for Forest Type Groups or other current references would be used as guidance for landscape-level biodiversity evaluations, old-growth protection, and design of timber harvests to promote biodiversity. The Biological Diversity Strategies would be updated periodically, with professional review, as new information and concepts are developed."

In May 1998, Remington's

Biodiversity Strategies was superseded by the Biodiversity Guidance as allowed for and encouraged under Biodiversity RMS 6 and 7. The Biodiversity Guidance was sent out for internal and external professional review in the summer and fall of 1997. Remington's Biodiversity Strategies is cited in the biodiversity Guidance as being a tool to help suggest appropriate cover types for various habitat types (BIO-9); however, Remington's Study is not to be used where it is inconsistent with the Biodiversity RMS or the Biodiversity Guidance.

In particular, the Landscape Planning and Old-Growth Protection

portions of Remington's Study are not applicable to current management strategies since they are inconsistent with direction in Biodiversity RMS 1, 3, and 6. The adoption of the Biodiversity Guidance in May 1998 clarified these inconsistencies and should be viewed as the current procedure for managing for biodiversity and old growth on State lands.

DNRC is currently revising its old-growth guidance and modifying its working definition of old growth based on definitions developed by Green, et al., (Old Growth Forest Types of the Northern Region, R-1 SES 4/92, USDA Forest Service,

TABLE D-2 - THE AMOUNT OF OLD STANDS FROM 1930S DATA FOR A HISTORICAL REFERENCE, THE CURRENT OLD-GROWTH DISTRIBUTION BY AGE CLASS ON COAL CREEK STATE FOREST, AND THE AMOUNT OF OLD GROWTH WITHIN THE FIRE PERIMETER (PRIOR TO THE FIRE) BY COVER TYPE

COVER TYPE	PERCENTAGE OF OLD STANDS BY COVER TYPE WITHIN CLIMATIC SECTION (DATA FROM 1930s)	PERCENTAGE OF COVER TYPE WITHIN COAL CREEK STATE FOREST THAT MEETS DNRC'S MINIMUM OLD-GROWTH CRITERIA	PERCENTAGE OF COVER TYPE WITHIN FIRE PERIMETER THAT MET DNRC'S MINIMUM OLD-GROWTH CRITERIA (PRIOR TO FIRE)
Ponderosa pine	74	0	0
Douglas-fir	6	57	0
Western larch/ Douglas-fir	47	34	0
Western white pine	17	76	0
Lodgepole pine	5	0	0
Mixed conifer	43	62	0
Subalpine fir	20	32	78

TABLE D-3 - THE MINIMUM NUMBER OF ACRES BY COVER TYPE OF OLD GROWTH NEEDED TO MEET DNRC'S CURRENT COMMITMENT FOR RETENTION ON COAL CREEK STATE FOREST AND THE NUMBER OF ACRES OF OLD GROWTH PRESENTLY ON THE FOREST

COVER TYPE	ACRES OF OLD GROWTH REQUIRED TO MEET DNRC'S CURRENT COMMITMENT	ACRES MEETING DNRC'S MINIMUM OLD-GROWTH CRITERIA ON COAL CREEK STATE FOREST
Douglas-fir	36	710
Western larch/Douglas-fir	1,489	618
Western white pine	56	443
Lodgepole pine	91	0
Mixed Conifer	299	2,277
Subalpine fir	188	1,258
Totals	2,159	5,306

Northern Region, Missoula, MT). According to our SLI, approximately 13 acres within the burned area that is proposed for harvest met the definition of old growth based on Green, et al, (1992) prior to the wildfire. This definition is based on the old-growth type code 4, which requires the presence of 10 trees 21 inches or greater in diameter in the stand. In the post-fire condition, this area would no longer meet the Green definition.

Existing Condition (Tables D-2 and D-3)

EFFECTS TO OLD GROWTH

Direct Effects

- ***Direct Effects of No-Action Alternative A***

No-Action Alternative A would not have any direct effect on the amount and distribution of old growth in the project area.

- ***Direct Effects of Action Alternatives B and C***

The tree mortality that occurred during the fire reduced the age class and live volume of the existing stand below DNRC's minimum old-growth criteria. Harvesting the dead and dying trees would have no direct effect on the old growth in the project area.

Indirect Effects

- ***Indirect Effects of No-Action Alternative A***

Under No-Action Alternative A, an old growth stand that evolves through natural regeneration and plant succession on this site may have few western white pine and western larch in its species mix.

- ***Indirect Effects of Action Alternatives B and C***

Action Alternatives B and C propose to plant rust-resistant western white pine and western larch. If an old-growth stand were allowed to develop after the implementation of Action Alternative B or C, a relatively high percentage of these species would make up the overstory dominants. Alternative C may have these effects over a reduced number of acres (up to 27 acres less).

Cumulative Effects

- ***Cumulative Effects of No-Action Alternative A***

The potential indirect effects on the species mix of future old-growth stands from implementing No-Action Alternative A would be in addition to the effects that occurred during the Cyclone/Coal '99 Timber Sale. The Cyclone/Coal '99 Timber Sale reduced the area that meets DNRC's minimum old-growth criteria by 12 acres; these acres were harvested using a seedtree with reserves harvest treatment. Additionally, 151 acres of an old-growth stand were entered with a harvest that retained most of the larger overstory trees, but reduced the structural diversity of the stand and, to a lesser degree, the amount of snags and coarse woody debris. The Cyclone/Coal 2000 Timber Sale may be initiated in the near future; if that occurs, approximately 408 acres that currently meet DNRC's minimum old-growth criteria would be entered. The proposed harvest treatments would retain many of the larger trees in the overstory, but the stands would still meet the current old-growth minimum criteria; however, the structural diversity of the stand would be

reduced and, to a lesser degree, the amount of snags and coarse woody debris.

• **Cumulative Effects of Action Alternatives B and C**

The potential indirect effects on the species mix of future old-growth stands from implementing Action Alternative B or C would be in addition to the effects that occurred during the Cyclone/Coal '99 Timber Sale. The Cyclone/Coal '99 Timber Sale reduced the area that meets DNRC's minimum old-growth criteria by 12 acres; these acres were harvested using a seedtree with reserves harvest treatment. Additionally, 151 acres of an old-growth stand were entered with a harvest that retained most of the larger overstory trees, but reduced the structural diversity of the stand and, to a lesser degree, the amount of snags and coarse woody debris. The Cyclone/Coal 2000 Timber Sale may be initiated in the near future and, if that occurs, approximately 408 acres that currently meet DNRC's minimum old-growth criteria would be entered with timber harvesting. The proposed harvest treatments would retain many of the larger trees in the overstory. The stands would still meet the current old-growth minimum criteria; however, the structural diversity in the stand would be reduced and, to a lesser degree, the amount of snags and coarse woody debris.

**INSECT AND DISEASE OCCURRENCE/
SNAGS AND COARSE WOODY DEBRIS**

EXISTING CONDITION

The area where the fire occurred and the harvesting is proposed was occupied by a stand, prior to the fire, that had medium vigor with areas of heavy stocking density, which can increase stress and insect

attack occurrences. The mortality in Douglas-fir was mostly attributed to the Douglas-fir bark beetle (*Dendroctonus pseudotsuga* Hopk.), and Armillary root rot (*Armillaria mellea* Vahl.). The mortality in subalpine fir was mostly attributed to the western balsam bark beetle (*Dryocoetes confusus*) while the mortality in Engelmann spruce was mostly attributed to the spruce bark beetle (*Dendroctonus rufipennis*). Some older mortality in lodgepole pine was attributed to the mountain pine beetle (*Dendroctonus ponderosa*).

Most of the trees within the fire perimeter were killed or were subject to enough heat to produce substantial basal girdling and/or crown scorch, which will cause tree mortality in the near future or, at the very least, greatly reduce its vigor and increase its susceptibility to insect attacks. Fire suppression efforts included felling trees that would represent a safety hazard to the people working on the fire. Subsequently, many trees of various species and diameter are on the ground throughout the fire perimeter. Some of these trees were burned enough so that they do not represent a food source or brooding area for bark beetles; however, many have enough green inner bark (cambium-phloem layer) to provide beetle habitat. Coal Creek State Forest, as a whole, has several areas where the Douglas-fir bark beetle is very active and substantial mortality is occurring, most notably on the southwest face of Winona Ridge and south of the fire on the south face of Coal Ridge. Approximately 85 percent of the trees within the fire area are dead and could be called snags; many of these trees had their crowns completely consumed by the fire. There are approximately 5 Douglas-fir and 3 western larch trees per acre. Approximately 40 percent of these are currently dead or will soon be dead. These large serals

have an average diameter at breast height (dbh) of 25 inches. The area proposed for harvesting has a clumpy distribution of coarse woody debris scattered throughout. Many areas where jackpots of trees fell or were felled during the fire occupy the ground in concentrations greater than 30 tons per acre. In some small portions within the fire perimeter, the fire burned hot enough to consume some of the larger logs and woody debris.

EFFECTS TO INSECT AND DISEASE OCCURRENCE/SNAGS AND COARSE WOODY DEBRIS

Direct Effects

• Direct Effects of No-Action Alternative A

The mortality caused by the fire removed most of the hosts that *Armillaria* root rot had on the site; given that the area will regenerate with relatively young vigorous trees or shrubs, the incidence of root rot is likely to decrease. The effect of fire on root disease is thought to include growth inhibition in *Armillaria* (Munnecke and Darley 1976), a reduction in viability of rhizomorphs (Hood and Sandberg 1989), and a reduction in viability of inoculated wood (Filip and Yang-Erve 1997). Because of the amount of trees stressed and on the ground, an increased risk of No-Action Alternative A to the trees in and around the fire would be if bark beetles are attracted to the area, relatively large populations would build up in the down material. This would start to occur after the snow melts in the spring of 2001, which is when the Douglas-fir bark beetle and Engelmann spruce beetle have their spring flight to attack hosts and lay eggs. The outbreak of Douglas fir, spruce, and pine engraver beetles outbreaks following

wildfires in 1988 and 1994 became extensive and quite damaging in Yellowstone National Park and portions of Montana (Amman and Ryan 1996). Snags and coarse woody debris would not be directly affected in the project area.

• Direct Effects of Action Alternatives B and C

As previously mentioned, the fire likely reduced the amount and activity of root rot on the site where the salvage harvesting is proposed. Given that this fire was predominantly a stand-replacement event and the proposed salvage would only retain a lightly scattered overstory upon completion, few direct effects to root rot mortality should occur from initiating Alternative B or C. Alternatives B and C propose to plant western larch and western white pine, species that are less susceptible to root rot attack. The salvage harvesting would take place during the summer of 2001. If bark beetles are attracted to the trees on the ground and the stressed trees within the fire perimeter, they will build up a population in the fire area during their spring flight; harvesting would remove the beetles from the area before they successfully reproduce. This timing is similar to the trap-tree strategy used to reduce Douglas-fir and Engelmann spruce bark beetle populations. A reduction in the occurrence of bark beetle mortality would likely be a direct effect of implementing Action Alternatives B and C. The current high amount of snags would be greatly reduced. Most of the western larch and Douglas-fir trees, approximately 8 trees per acre, would be retained for snags and seedtrees with this proposed action. These trees are distributed in clumps. Many trees were burned enough to make them unsalvageable for wood products and will be left as snags.

Approximately 60 percent of the coarse woody debris that is currently distributed throughout the area would be removed with the proposed action. An average of 12 to 18 tons per acre of coarse woody debris would be retained on site.

Indirect Effects

• Indirect Effects of No-Action Alternative A

If a bark beetle populations build up within the fire area, mature trees in the adjacent stands would be at high risk to being attacked and, subsequently, mortality would occur. This buildup of insects and subsequent mortality after a fire is likely well within the range of natural occurrences; however, the Douglas-fir bark beetle is currently very active and at relatively high populations on Coal Creek State Forest. If subsequent mortality is high from insect attack, additional timber sale project proposals may be initiated to capture the value of dead and dying trees. Many of the dead standing trees will likely fall in the next 20 years, which will decrease the amount of snags and increase the amount of down woody debris. The change will likely occur gradually, but will happen at a much faster rate than the decomposition of the woody debris that is now on the ground. This would, potentially, lead to a high buildup of woody debris.

• Indirect Effects of Action Alternatives B and C

Because Action Alternatives B and C propose planting western larch and western white pine, the stands that mature over time with this species mix will, potentially, have a lower occurrence of mortality from root rot. The timing of harvesting could reduce the bark beetle population

substantially if bark beetles are attracted to the fire area during their spring flight. This reduction of bark beetle populations could reduce the incidence of attack in adjacent mature timber stands over time.

Cumulative Effects

• Cumulative Effects of No-Action Alternative A

A recent timber sale that was logged (Cyclone/Coal '99) and another that is proposed to be logged (Cyclone/Coal 2000) on Coal Creek State Forest were designed in part to reduce the risk of both bark beetle and root rot mortality over time. The effects of No-Action Alternative A would likely reduce the trend of these 2 timber sales in reference to lower mortality from insects and diseases. Both projects were designed to retain large western larch and Douglas-fir in harvest units for snag recruits and seedtrees, as well as retaining approximately 12 to 18 tons per acre of coarse woody debris.

• Cumulative Effects of Action Alternatives B and C

A recent timber sale that was logged (Cyclone/Coal '99) and another that is proposed for logging (Cyclone/Coal 2000) on Coal Creek State Forest were designed, in part, to reduce the risk over time of bark beetle and root rot mortalities. The effects of Alternatives B and C would coincide with the effects of these 2 timber sales in reference to trends in lower mortality from insects and diseases. Alternative C may have these effects over a reduced number of acres (up to 27 acres less).

Both projects were designed to retain large western larch and

Douglas-fir trees for snags and seedtrees in the harvest units, as well as retaining 12 to 18 tons of coarse woody debris per acre.

NOXIOUS WEEDS

EXISTING CONDITION

Noxious weeds on Coal Creek State Forest are located, primarily, along roads and in disturbed areas, such as landings and borrow pits. The most prevalent species in the area are spotted knapweed (*Centaurea maculosa*) and orange hawkweed (*Hieracium aurantiacum* L).

Stillwater State Forest works with the Flathead County Noxious Weed District to help control weeds through monitoring and spraying herbicides on site-specific areas on the Coal Creek State Forest road system. The road system used to access the fire for suppression efforts was cleared of vegetation on the road surface; turnouts and parking areas were graded, exposing mineral soil. Many motorized vehicles accessed the area during the fire suppression efforts and, undoubtedly, weed seed was spread on the previously closed road system.

EFFECTS TO NOXIOUS WEEDS

Direct Effects

• Direct Effects of No-Action Alternative A

No additional direct effect to encroachment and establishment of noxious weeds would occur with No-Action Alternative A. Regardless of the alternative chosen, the road system that was opened for the fire will be grass seeded in the spring of 2001 to mitigate for the effects of the fire on erosion and weed establishment. Roadside vegetation will begin to reestablish soon after seeding has been accomplished and motorized vehicle use is restricted.

• Direct Effects of Action Alternatives B and C

Action Alternatives B and C propose the operation of harvesting and yarding equipment, log trucks, and personal vehicles on the road system that was opened up to access the fire. Additional mineral soil will be exposed through the operation of this equipment in the fire area and during the construction of landings and temporary roads. Measures that would be implemented to reduce the establishment of additional weed populations include:

- surface blading to remove weeds before the seed-set stage on the road system affected by the proposal.
- all tracked and wheeled equipment be cleaned of noxious weeds prior to beginning project operations; the contract-administrating officer will inspect equipment periodically during project implementation.
- prompt revegetation of disturbed roadside sites; roads used and closed will be reshaped and grass seeded.

Regardless of the alternative chosen, the road system opened for the fire will be grass seeded in the spring of 2001 to mitigate for the effects of the fire on erosion and weed establishment.

Indirect Effects

• Indirect Effects of No-Action Alternative A

No-Action Alternative A would not expose mineral soils along the closed road system that accesses the fire area. Therefore, no new sites that would have a high likelihood of becoming established with noxious weeds would be produced.

• *Indirect Effects of Action Alternatives B and C*

Action Alternatives B and C would expose mineral soil in the project area in addition to what has already occurred. Over the long term, if mitigation measures are not successful, this could lead to the establishment of additional populations of noxious weeds, which could require additional weed-management measures, such as herbicide treatment and grass seeding.

Cumulative Effects

• *Cumulative Effects of No-Action Alternative A*

Other effects to noxious weed occurrence in the analysis area include:

- motorized vehicles, which are a source of noxious weed seed, traveling the open roads and
- natural sources of erosion that may expose mineral soils, predisposing an area to invasion by noxious weeds.

Ground-disturbing activities on the Cyclone/Coal '99 Timber Sale and the proposed activities on the Cyclone/Coal 2000 Timber Sale could also increase noxious weed occurrence on Coal Creek State Forest. A recently initiated weed-management program includes ongoing weed monitoring and spot herbicide application on Coal Creek State Forest, which should decrease noxious weed occurrence over time.

• *Cumulative Effects of Action Alternatives B and C*

Action Alternatives B and C would affect the occurrence of noxious weeds in the project area, as would motorized vehicles traveling the open roads, which are a source of noxious weed seed. Natural sources of erosion may also expose mineral soils, predisposing areas to the invasion of noxious weeds. Ground-disturbing activities on the Cyclone/Coal '99 Timber Sale and proposed activities on the Cyclone/Coal 2000 Timber Sale could also potentially increase noxious weed occurrence. A recently initiated weed management program includes ongoing weed monitoring and spot herbicide application on Coal Creek State Forest, which should decrease noxious weed occurrence over time.

SENSITIVE PLANTS

EXISTING CONDITION

A review of the sensitive plant survey conducted on the Coal Creek State Forest in 1997 and the listing from the Montana Natural Heritage Program shows no sensitive plant species in or near the project area. Regardless of whether No-Action Alternative A or Action Alternative B or C was implemented, there would be no effect to sensitive plant species.

CYCLONE RIDGE FIRE TIMBER SALVAGE
ENVIRONMENTAL ASSESSMENT CHECKLIST
ECONOMICS
ANALYSIS
APPENDIX E

METHODS

The economic analysis will include estimates of costs, revenues, and returns; these estimates are intended for the relative comparison of alternatives and are not intended for use as absolute estimates of return. The stumpage value was estimated to equal the delivered log prices minus costs and an amount for profit and risk (10 percent). The Montana Sawlog and Veneer Log Price Report, based on July-September 2000 data, was used for the estimated delivered price/species. Costs include estimated development, logging, and hauling costs and forest improvement payments.

EXISTING CONDITION

Based on past study, 20 to 35 percent of the economy of Flathead County can be attributed to the wood-products industry (*The Role of the Wood Products Industry in the Economy of Flathead County, Montana, an Estimate of the Effects on Total Employment Using Input-Out Analysis*,

Beckly 1994). The log market has been on a downward trend in the last 2 quarters based on the difference in delivered mill prices, which was supplied by the Bureau of Business and Economic Research at the University of Montana. The outlook is for prices to remain low into the next year (Charles Keegan, Bureau of Business and Economic Research Montana Saw log and Veneer Log Price Report 11/30/2000). A representative of a potential purchaser and a State scaler were taken to the fire site to provide input on the current value of the burned timber. The condition of the timber was considered salvageable for sawlog material at this point; however, both felt that considering the species mix involved, if the wood was not harvested in the next operating season (July through September, 2001), there was a high risk of substantial checking and loss of value. Given the relatively expensive yarding that is required to retrieve the logs, delaying harvesting for an extended period of time would likely make this sale economically unfeasible.

EFFECTS ANALYSIS

TABLE E-1 - COSTS AND BENEFITS ASSOCIATED WITH PROJECT BY ALTERNATIVE

	Alternatives	
	A	B and C
Estimated total harvest volume (MBF)	0	946
Development Costs (\$/MBF)		8.27
Estimated stumpage value (\$/MBF)		91.00
Forest Improvement Fee (FI) (\$/MBF)		52.25
Estimated stumpage value, FI, and development cost (\$/MBF)		151.52
Total timber-dollar value based on estimated stumpage value, FI cost, and development cost multiplied by the estimated harvest volume		143,338
Estimated stumpage value and FI (\$/MBF)		143.25
Total timber-dollar revenue to the State	0	135,514
Alternative C may yield 30% less volume, which would reduce the total timber revenue to the State by \$40,654.		

• *Effects Of Implementing No-Action Alternative A*

Direct Effects

Project-area revenue would not change from the existing condition. Since the trees that would be harvested are dead and will lose commercial value for forest products in the near future, the opportunity to capture that value will be lost.

Indirect Effects

No change would be expected to the annual cash flow for DNRC's Statewide timber program provided another sale could be substituted to replace this project.

Cumulative Effects

No change to the area's economy would be expected provided a local mill purchases a substituted amount of timber. Lack of a viable substitution could result in a negative effect on either DNRC's annual cash flow or the local economy.

• *Effects of Implementing Action Alternative B*

Direct Effects

Implementation of Action Alternative B would allow adequate time for the entire estimated volume to be harvested without additional scheduling requirements or hauling and logging cost. The estimated project revenue that would be deposited in school trust accounts would be \$86,086. The estimated revenue that would be deposited into the FI account is \$49,428. Approximately \$7,824 of road improvement work would also be accomplished.

Indirect Effects

No appreciable changes to the annual cash flow for DNRC's timber program would take place from the existing condition. The cost of reforestation is estimated to be \$5,541, which is funded by the FI account.

Cumulative Effects

If implemented, a local mill will likely purchase this timber sale, and the local economy will benefit from the availability of the stumpage sold.

• *Effects of Implementing Action Alternative C*

Direct Effects

If Alternative C were implemented, a high risk exists that the purchaser would be unable to harvest the estimated 946 MBF in the short period of time; a large portion the harvest area requires skyline yarding, which has a lower daily production rate than conventional yarding. This could cause a reduction of up to 30 percent of the volume or require multiple skyline-logging contractors to be working simultaneously off the same road system. Special scheduling, extended hours, and, possibly, working on weekends and/or hauling logs at night would be required. Even with multiple skyline-logging contractors working on this project at the same time, an equipment breakdown may cause a reduction in the volume that could be moved in 30 days. This risk

could negatively affect the economic return to the State by recovering less of the available salvage volume or increasing the cost and risk to potential purchasers, thereby decreasing the stumpage value they would be willing to bid. After contacting potential bidders it was determined that analyzing for an exact reduction in potential bid prices would be too speculative at this time. A 30 percent reduction in volume would reduce the total timber revenue to the State by \$40,654, approximately.

Indirect Effects

No appreciable changes would occur from the existing condition to the annual cash flow for DNRC's timber program. The cost of reforestation is estimated to be \$3,889 if there is a 30 percent reduction in harvest, which is funded by the FI account.

Cumulative Effects

If implemented, a local mill will likely purchase this timber sale, and the local economy will benefit from the availability of the stumpage sold.

CYCLONE RIDGE FIRE TIMBER SALVAGE
ENVIRONMENTAL ASSESSMENT CHECKLIST
WILDLIFE
ANALYSIS
APPENDIX F

INTRODUCTION

The existing environment is discussed in this section. This description occurs on 2 scales:

- The first scale relates to the project area and/or the unit(s) proposed for harvest. Full descriptions for the project area and proposed harvest units are presented in *FIRE OVERVIEW*, *APPENDIX B* and the *CHECKLIST EA*.
- The second scale relates to the surrounding landscape. This scale varies according to the species being discussed. Under each grouping or species heading, the size and description for the cumulative effects analysis area will be defined. If habitat does not exist in the project area, the analysis for that species will be dropped from this analysis.

METHODS

To assess the existing condition of the project area and the surrounding landscape, a variety of techniques were used. Field visits, scientific literature, stand level inventory (SLI) data, aerial photography, Montana Natural Heritage program data, and consultations with other professionals provided information for the following discussion and effects analysis in Chapter IV. In Chapter IV, habitat quality and

quantity of habitat changes from the existing conditions were calculated and explained. Specialized methodologies are discussed under the species in which they apply.

AFFECTED ENVIRONMENT

COARSE-FILTER ANALYSIS

DNRC recognizes that it is an impossible and unnecessary task to assess an existing environment or the effects of proposed actions on all wildlife species. We assume that if landscape patterns and processes similar to those that species adapted to are maintained, the full complement of species will be maintained across the landscape (DNRC 1996). This "coarse filter" approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across a landscape (refer to *VEGETATION*, *APPENDIX C*).

Presently, the project area is underrepresented in the western larch/Douglas-fir cover type and overrepresented in the mixed-conifer and lodgepole pine cover types. This shift probably benefited species that use mixed-conifer and lodgepole pine cover types over species that use the western larch/Douglas-fir cover type. Additionally, this conversion

usually includes a conversion to a higher canopy closure, which results in a sparser and moister understory. Again, species that use habitats in these conditions probably benefited from this conversion.

The wildfire that burned in this area reconstructed a habitat that is underrepresented on today's landscape. The wildfire killed and weakened trees, consumed understory vegetation, and opened up the tree canopy. These conditions provide habitat for early serial wildlife species and species that require burned or weakened trees for foraging and nesting.

The cumulative effects analysis area is based on the vegetation analysis and will use the same cumulative effect analysis area.

Effects to Coarse Filter

Under No-Action Alternative A and Action Alternatives B and C, forest cover types in the project stands would be brought into alignment with the appropriate type. DNRC assumes that this would benefit native species in the area by managing vegetation to resemble the habitats that species adapted to prior to European settlement. Under Action Alternatives B and C, planting would occur to ensure that regeneration favors seral species (western larch, Douglas-fir, and western white pine) believed to be appropriate for the project site.

Under No-Action Alternative A, fire-killed and fire-stressed trees would be retained on the site. This would produce an increase in forest insects and snags, resulting in increased forage and nesting sites for insectivorous and cavity-nesting wildlife species. Due to the survival of some trees marked as fire-stressed, the retained tree canopy cover probably would be higher than under Action Alternatives B and C. Additionally,

a variety of the burned habitats would be retained on the landscape. Under Action Alternatives B and C, a majority of the fire-killed or stressed shade-tolerant trees would be removed. Additionally, some dead or dying Douglas-fir would be harvested. All larch would be left. The harvest would remove some of the trees that would provide structure in the future stand. However, the main target species, subalpine fir and Engelmann spruce, are not expected to contribute strongly to this future structure.

The density of medium to large snags and snag recruits retained in the reserve areas and scattered in the proposed units would exceed DNRC's internal guidance, thereby providing foraging and nesting habitats. However, in harvested stands, the habitat quality for insectivorous and cavity-nesting species would be reduced following harvesting and into the future until the retained regeneration can attain a medium-to-large size and die.

Cumulative effects in the coarse-filter analysis follow the vegetation analysis. Under No-Action Alternative A, DNRC would retain the full complement of fire affected habitats. Snags and snag-recruitment trees would be retained at the maximum amount. Wildlife species that use snags and/or burned forest habitats would be benefited in the short-term, while species that use downed woody material would be benefited in the longer term as these snags fall to the ground. Under Action Alternatives B and C, snags would be decreased immediately through harvesting and indirectly by removing snag recruits. Overall, wildlife species that use cavities, downed woody debris, forested habitats, and/or prey on forest insects might be impacted, to a slight degree, under Action Alternatives B and C.

FINE-FILTER ASSESSMENT

On any particular piece of ground, however, individual species that are recognized to be of special concern are evaluated (a "fine-filter analysis"), and those are the species that are addressed below. They include wildlife species Federally listed as "threatened" or "endangered", species listed as "sensitive" by DNRC, and species managed as "big game" by Montana Fish, Wildlife, and Parks (FWP). We would manage to maintain rare or unique habitats and make reasonable attempts to pursue cooperative planning with major adjacent landowners (DNRC 1996).

THREATENED AND ENDANGERED SPECIES

Four species indigenous to northwestern Montana are classified as threatened or endangered under the Endangered Species Act of 1973. The bald eagle, Canada lynx, and grizzly bear are listed as threatened, while the wolf is listed as endangered. Suitable habitat for all these species occurs in or near the project area.

> Bald Eagle

The bald eagle is classified as threatened and is protected under the Endangered Species Act. Strategies to protect the bald eagle are outlined in the *Pacific States Bald Eagle Recovery Plan* (U.S. Fish and Wildlife Service 1986) and the *Montana Bald Eagle Management Plan* (Montana Bald Eagle Working Group 1994). For the Cyclone Lake nesting pair, a bald eagle nest plan was developed and guides the management of bald eagles in the project area (McFadden 1992).

The project area is not within any known bald eagle territory and contains marginal habitat. Bald eagle use is confined to the area

immediately adjacent to Cyclone Lake and Cyclone Creek. However, a moderately used flight pattern incorporates the northeastern portion of the project area.

Since the project area is included because of its position in the flight paths of bald eagles, the cumulative effects area considers the area that include flight patterns. The only other consideration in this area is the proposed helicopter harvests on Winona Ridge.

Direct Effects to Bald Eagles

• Direct Effects of No-Action Alternative A

No change is expected in the direct effects to bald eagles.

• Direct Effects of Action Alternatives B and C

Under Action Alternative C, some disruption to the flight paths might occur. Under Action Alternative B, the duration of disturbance would be longer. However, since all operations are ground based, the eagle disruption is expected to be negligible.

Indirect Effects to Bald Eagles

Since no alternative affects any area used substantially by eagles, no indirect effects are expected.

Cumulative Effects to Bald Eagles

The cumulative effects to bald eagles are expected to occur only while the project is active. Under No-Action Alternative A, no additional disturbance is expected. Under Action Alternatives B and C, the effects of this project might add to the effects expected from the Cyclone/Coal 2000 Timber Sale. The Winona Ridge (Cyclone/Coal 2000) harvests

would occur after the eaglet fledging (August 1). If both projects occur concurrently, 2 of 3 flight patterns would include timber-harvesting activities; however, the proposed harvesting is not expected to disrupt eagles substantially. Therefore, the cumulative effects are expected to be negligibly higher, but similar to the effects described for the Cyclone/Coal 2000 Timber Sale.

➤ *Canada Lynx*

Canada lynx are listed as threatened under the Endangered Species Act. Currently, no recovery plan exists. The project area contained potential denning habitat prior to the fire. The project area is interspersed with regeneration stands, which are expected to provide foraging opportunities for lynx. The fire removed potential denning habitat.

Cumulative effects were analyzed for the Lower Coal Lynx Analysis Unit (LAU).

Direct Effects to Canada Lynx

- ***Direct Effects Common To All Alternatives***

No substantial direct effects are expected. Canada lynx do not appear to avoid roads with low traffic volumes, so increased logging traffic on gated roads is not expected to displace or increase the energetic cost of individual lynx.

- ***Direct Effects of Action Alternatives B and C***

Since Action Alternative B would be of longer duration, the risks of direct effects, albeit negligible, would be higher than Action Alternative C.

Indirect Effects to Canada Lynx

- ***Indirect Effects Common to All Alternatives***

Road use by recreationalists and/or trappers is expected to remain unchanged; therefore, no increase in mortality risk is expected under any alternative.

- ***Indirect Effects of No-Action Alternative A***

Canada lynx foraging habitat is expected to develop slower than under Action Alternatives B and C.

- ***Indirect Effects of Action Alternatives B and C***

The planting of seedlings prescribed is expected to accelerate the development of snowshoe hare habitat. The removal of the burned trees might reduce the downed material in the future stand. However, the material being removed (subalpine fir and Engelmann spruce) rots quickly and probably would be incorporated into the soil by the time the stand developed denning characteristics. The retention of buffers around streams would provide travel corridors through the area. Therefore, Action Alternatives B and C are expected to produce negligible negative effects, while possibly increasing foraging habitat sooner than under No-Action Alternative A.

Cumulative Effects to Canada Lynx

Under all alternatives, Canada lynx foraging habitat would increase in time. This increase would be additional to the increases expected due to the Cyclone/Coal 2000 Timber Sale. Again, the difference between

Action Alternatives B and C and No-Action Alternative A is actually a time issue. No additional loss of denning habitat is expected; therefore, the cumulative effects of either alternative area are expected to be negligible.

➤ *Grizzly Bear*

Grizzly bears are listed as threatened under the Endangered Species Act. The project area provides primarily spring habitat. The fire removed hiding cover in the project area. A brushed-in road was opened for fire suppression activities. Prior to opening this road, the area was considered security core.

The cumulative effects analysis was conducted using the State Coal Cyclone and Hay Creek subunits. Presently, State lands in the State Coal Cyclone Subunit provide approximately 10,351 acres (75 percent) of hiding cover following the Cyclone/Coal '99 Timber Sale and Cyclone Ridge Fire. A moving-windows analysis (Ake 1994) indicates that the amount of lands in the State Coal Cyclone Subunit over road thresholds are: 34.5 percent (45.7 percent on State lands) in excess of 1 mile per square mile of open-road density and 30.6 percent of the subunit (36.2 percent on State lands) in

excess of 2 miles per square mile of total roads. The amount of potential core in the subunit is 47.4 percent (40.5 percent on State lands). This project might affect road-related conditions in the Hay Creek Subunit. The existing parameters in this subunit are: 56.8 percent (20.9 percent on State lands) in excess of 1 mile per square mile of open-road density, 34.2 percent of the subunit (46.3 percent on State lands) in excess of 2 miles per square mile of total roads, and 38.3 percent (18.1 percent on State lands) of potential core (refer to TABLE F-1-EXISTING MOTORIZED ACCESS PARAMETERS IN THE STATE COAL CYCLONE AND HAY CREEK SUBUNITS). Managing motorized access reduces the potential for mortality, displacement from important habitats and habituation to humans and provides relatively secure habitat, which reduces the energetic costs of bears (Interagency Grizzly Bear Committee [IGBC] 1998).

Direct Effects to Grizzly Bears

• *Direct Effects of No-Action Alternative 1*

The road accessing the area would be physically closed to prevent motorized travel; road closure would consist of a tank trap with a series of kelly humps and slash along the first 200 feet behind the tank trap.

TABLE F-1- EXISTING MOTORIZED ACCESS PARAMETERS IN THE STATE COAL CYCLONE AND HAY CREEK SUBUNITS*

SUBUNIT	ACRES IN SUBUNIT (STATE LANDS)	%SUBUNIT (STATE LANDS) MORE THAN 1 MILE PER SQUARE MILE	%SUBUNIT (STATE LANDS) MORE THAN 2 MILES PER SQUARE MILE	POTENTIAL CORE IN SUBUNIT (STATE LANDS) +
State Cyclone	31,222	34.5%	30.6%	47.5%
Coal	(13,491)	(45.7%)	(36.2%)	(40.5%)
Hay Creek	33,278	56.8%	34.2%	38.3%
	(2,104)	(20.9%)	(46.3%)	(18.1%)

* Potential core refers to the area that is 500m (approximately 1,640 feet) from an open or gated road.

1The most complete DNRC road database was used to analyze road parameters; however, recent changes made on USFS lands were not reflected in this database.

Therefore, the amount of disturbance would revert to the amount prior to the fire. Under these conditions, bears appear to use the area.

• ***Direct Effect of Action Alternatives B and C***

Under Action Alternative C, the road would be used to harvest and haul the burnt timber from the area during July 1 through August 1; under Action Alternative B, the road would be used to harvest and haul the burnt timber from the area during the summer period of July 1 through September 15 (FIGURE F-1—EXISTING MOTORIZED ACCESS PARAMETERS IN THE STATE COAL CYCLONE AND HAY CREEK SUBUNITS). When logging is not in operation, the gate would be locked to eliminate public use of the road. Following the project, the road accessing the project would be obliterated as described in No-Action Alternative A. The use of the road and lack of hiding cover in the burned area is expected to result in bears avoiding an additional 603 acres of habitat. Harvesting would occur during the summer when habitat is abundant and bears are least susceptible to additional energetic costs. Also, the area affected does not appear to be high-quality summer habitat (Mace et al. in progress). However, whether bears travel through the area or might be using the area due to the historic low amounts of disturbance is unknown. Therefore, the effects of Action Alternatives B and C are unknown, but are expected to be negligible. Although negligible, Action Alternative B would be expected to result in more displacement and increased energetic costs than Action Alternative C.

Indirect Effects to Grizzly Bears

• ***Indirect Effects Common to All Alternatives***

Under all alternatives, hiding cover is not expected to change. The fire is expected to stimulate shrub and herbaceous plant growth (Marten 1979, Zager 1980). The increase in herbaceous plant growth would benefit bears, especially in the spring; all alternatives are expected to result in similar increases in forage.

• ***Indirect Effects of Alternatives B and C***

Hiding cover is expected to develop in a shorter period of time than under No-Action Alternative A.

Cumulative Effects to Grizzly Bears

• ***Cumulative Effects of No-Action Alternative A***

Motorized access to the area would revert to conditions prior to the fire, and hiding cover would be retained at 75 percent. Since the motorized access parameters would revert to the existing condition prior to the fire and hiding cover would be retained above 40 percent, no measurable effects to grizzly bears are expected.

Grizzly bears tend to avoid habitats when open-road density exceeds 1 mile per square mile and total road density exceeds 2 miles per square mile (Mace 1997). No-Action Alternative A, with obliteration of the road that accesses the project area, fully meets DNRC guidance (TABLE F-2—THE AMOUNT OF CHANGE [BY ACRES] PRODUCED UNDER THE 3 OPTIONS IN STATE CYCLONE COAL SUBUNIT, HAY CREEK SUBUNIT, AND BOTH SUBUNITS COMBINED).

TABLE F-2 - THE AMOUNT OF CHANGE (BY ACRES) PRODUCED UNDER THE 3 OPTIONS IN STATE CYCLONE COAL SUBUNIT, HAY CREEK SUBUNIT, AND BOTH SUBUNITS COMBINED

OPTION	OPEN ROAD DENSITY*					TOTAL ROAD DENSITY					SECURITY CORE				
	STATE COAL CYCLONE	HAY CREEK	DURING PROJECT	AFTER PROJECT		STATE COAL CYCLONE	HAY CREEK	DURING PROJECT	AFTER PROJECT		STATE COAL CYCLONE	HAY CREEK	DURING PROJECT	AFTER PROJECT	
	CHANGES IN THE AMOUNT OF ACRES OF GRIZZLY BEAR HABITAT AFFECTED BY OPEN ROADS					CHANGES IN THE AMOUNT OF ACRES OF GRIZZLY BEAR HABITAT AFFECTED BY TOTAL ROADS					CHANGES IN THE AMOUNT OF ACRES IN POTENTIAL SECURITY CORE				
1	-603	0	-603	0		-934	+829	-105	+829		-368	+353	-16	+353	
2	-603	0	-603	0		-934	+882	-52	+882		-368	+875	+507	+875	
3	-603	0	-603	0		-884	+899	+15	+899		-253	+882	+629	+997	
*If Alternative C is selected, the increase in PERCENT OF OPEN ROAD under any option would be 0.															

• **Cumulative Effects Common to Action Alternatives B and C**

The road accessing the project area would be considered in total-road-density and security-core calculations to assess the effects to grizzly bears, resulting in an additional 934 acres exceeding 2 miles per square mile of total roads and the reduction of 368 acres of security core. Depending on the options chosen for road obliteration on the "eye-of-the-needle" road, the effects of these alternatives vary. Displacement might occur from the percentage increase of total roads and the reduction in security core.

Under both Action Alternatives B and C, the road accessing the project area would be obliterated, and the area would again be considered security core after completion of the timber harvests.

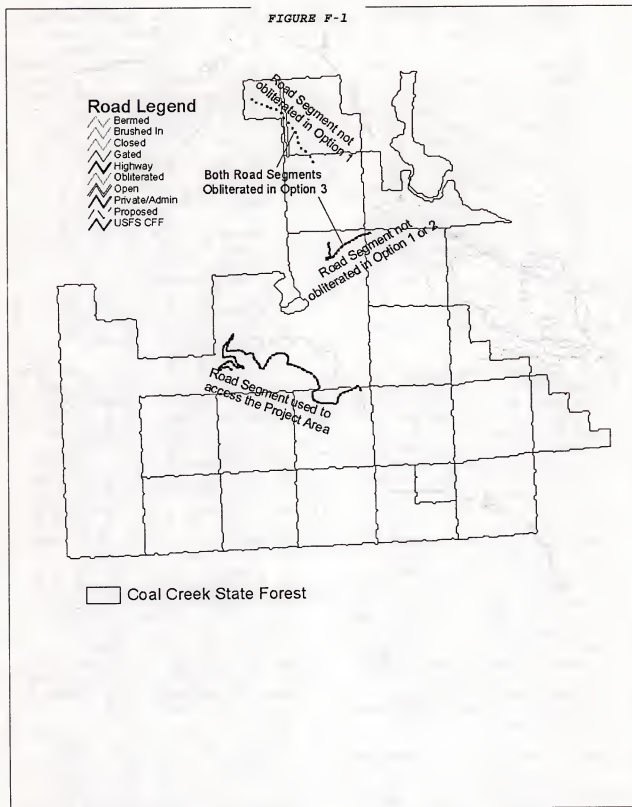
To mitigate for increased disturbance and displacement from motorized access under the Action Alternatives B and C, 3 options were developed (FIGURE

F-1):

- * Option 1 - Some short-term displacement and avoidance of 105 acres due to increased total-road density and the loss of 16 acres in security core are expected. The additional security core gained by the obliteration of portions of the road on Winona Ridge would provide a movement corridor through the "eye of the needle"; however, this would be on the side slope, since the road through the "eye of the needle" would still be accessible. Following the project, bears would gain 353 acres of security core in the Hay Creek Subunit
- * Option 2 - Bears would lose 52 acres of habitat due to total-road densities, but would gain 507 acres of security core. The core area would be similar to Option 1, but would include 875 acres and extend further north. Following the project, the total-road density above the 2 mile per square mile threshold would decrease by 882 acres and security core

Any road closed to achieve DNRC commitments would be obliterated with a tank trap or large boulders to discourage motorized/human use of the road. The closure would be maintained for a minimum of 1 year, but preferably longer.

FIGURE F-1



would increase by 875 acres in the Hay Creek Subunit.

- * Option 3 - Bears would gain 15 acres of habitat due to road obliteration and 629 acres of security core. Following the project, 899 acres of habitat would be gained by the reduction of total road density and security core would increase by 997 acres. This security core area would include the eye of the needle, which appears to be an important migratory/movement corridor between Glacier National Park and Coal Creek State Forest.

- ***Cumulative Effects of Action Alternative B***

Action Alternative B is similar to Action Alternative C, except the road used to access the project area would be used for the summer period (July 1 through September 15) causing it to be reclassified as an open road. No data exists to quantify the impacts of using the road for 30 days versus 75 days; however, it is likely that the impacts would increase with the length of time used. Under Action Alternative B, the amount of area that bears would avoid would increase by 603 acres due to the open-road densities. The effects of this alternative would depend on which mitigation option is chosen. Each option is expected to adequately mitigate the open-road disturbance by developing secure areas elsewhere.

- ***Cumulative Effects of Action Alternative C***

Action Alternative C is similar to Action Alternative B, except the road that accesses the project area would be used for less than 30 days, allowing the

road to be considered restricted and not open. Under Action Alternative C, no increase in the percent of open roads would occur. Action Alternative C fully meets DNRC guidance (TABLE F-2-THE AMOUNT OF CHANGE [BY ACRES] PRODUCED UNDER THE 3 OPTIONS IN STATE CYCLONE COAL SUBUNIT, HAY CREEK SUBUNIT, AND BOTH SUBUNITS COMBINED).

➤ ***Northern Rocky Mountain Wolf***

The Northern Rocky Mountain Wolf is listed as endangered under the Endangered Species Act. The Northern Rocky Mountain Wolf Recovery Plan defines 3 recovery zones (U.S. Fish and Wildlife Service 1987). The proposed project is in the Northwest Montana Recovery Zone.

The wolf is a wide-ranging, mobile species. Adequate habitat for wolves consists of adequate vulnerable prey and minimal human disturbance, especially at den and/or rendezvous sites. Primary prey species in northwest Montana are white-tailed deer, elk, moose, and mule deer. The distribution of wolves is strongly associated with the white-tailed deer winter range. Typically, wolves in northwest Montana den in late April. Wolves choose elevated areas in gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas for dens and rendezvous sites. Wolves are most vulnerable to human disturbance at den and rendezvous sites.

The project area does not contain any big game winter ranges and harvesting would occur in the summer months when wolf pups are mobile; therefore, no effects to wolves are expected and will not be considered further in this analysis.

SENSITIVE SPECIES

When conducting forest-management activities, the SFLMP directs DNRC to give special consideration to the several "sensitive" species. These species are sensitive to human activities, have special habitat requirements that may be altered by timber management, or may become listed under the Federal Endangered Species Act if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful "fine filter" for ensuring that the primary goal of maintaining healthy and diverse forests is met.

A search of the Montana Natural Heritage Database did not return any sensitive species sightings in, or within 1 mile, of the project area. However, the following sensitive species were considered for analysis because suitable habitat might occur

in the project area. Each sensitive species was either included in the following analysis or was dropped from further analysis for various reasons (TABLE F-3-LISTED SENSITIVE SPECIES FOR NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROJECT).

> Black-Backed Woodpecker

Black-backed woodpeckers use burned forested stands for foraging and nesting. Black-backed woodpeckers forage extensively on Douglas-fir, although other tree species are used to some degree. On average, black-backed woodpeckers forage on trees larger than 12 inches dbh relatively more than their availability (Hejl and McFadden 1998), searching for the larvae of wood-boring insects. These insects readily invade burned stands and supply black-backed woodpeckers with adequate forage. Additionally, insect outbreaks in

TABLE F-3 - LISTED SENSITIVE SPECIES FOR NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROJECT

SPECIES	DETERMINATION - BASIS
Black-backed woodpecker	Included - Recently (less than 5 years) burned areas in the project area.
Boreal owl	Included - Proposed units occur above 5,000 feet.
Coeur d'Alene Salamander	Dismissed - No moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	Dismissed - No suitable grassland communities occur in the project area.
Common loon	Dismissed - No harvesting is proposed near the Cyclone Lake shoreline.
Ferruginous hawk	Dismissed - No suitable grassland communities occur in the project area.
Fisher	Included - Potential fisher habitat occurs in the area.
Flammulated owl	Dismissed - No dry ponderosa pine habitats occur in the project area.
Harlequin duck	Dismissed - No suitable streams occur in the area.
Mountain plover	Dismissed - No suitable grassland communities occur in the project area.
Northern bog lemming	Dismissed - No sphagnum or other fen/moss mats occur in the area.
Pileated woodpecker	Included - Western larch/Douglas-fir and mixed-conifer habitats occur in the area.
Townsend's big-eared bat	Dismissed - No caves or mine tunnels occur in the project area.
Page F-10	Wildlife Analysis

unburned stands may also provide feeding opportunities; however, this information is only speculative.

Black-backed woodpeckers usually nest in trees that contain some heartrot. These snags predate the stand-replacing fire. On average, black-backed woodpeckers use 12- to 16-inch DBH snags for nesting. Douglas-fir, western larch, and ponderosa pine are preferred species for nesting. Subalpine fir, grand fir, and Englemann spruce are used approximately in relation to their abundance, while lodgepole pine is avoided (Hejl and McFadden 1998).

DNRC internal guidance suggests that a minimum of 20 percent of the burned area be deferred. The deferred area should broadly represent the entire burn and be in somewhat contiguous patches. In the harvested area, at least 13 percent of the area should retain 50 percent of the existing basal area after harvesting is completed. Again, this area should be clustered and in contiguous blocks near the deferred area. The remaining area (maximum 67 percent) can be harvested without restriction. Some latitude for variance from the guidance may be allowed due to adjacent ownership management.

For cumulative effects, Coal Creek State Forest, which consists of 13,793 acres, was considered.

Direct Effects to Black-backed Woodpeckers

• *Direct Effect of No-Action Alternative A*

No direct effects are expected.

• *Direct Effects of Action Alternatives B and C*

Harvesting would occur after

July 1. By this time, the black-backed woodpecker young would have fledged; therefore, no direct effects are expected.

Indirect Effects to Black-backed Woodpeckers

• *Indirect Effect of No-Action Alternative A*

The maximum amount of black-backed woodpecker habitat available would be retained. Whether black-backed woodpeckers would colonize the burned areas to feed and nest is unknown due to the relatively small size and isolated habitat of the burned area. If black-backed woodpecker use occurs, the birds would be expected to use the area for approximately 5 years.

• *Indirect Effect of Action Alternatives B and C*

Salvage would occur in approximately 104 acres of the burned area. The remaining area would be unharvested. However, only 63 acres of the unharvested area supports potential habitat. The remaining 40 acres support young-aged (0-to-39-year-old regeneration units) stands. The amount unharvested exceeds the guidance (41 acres) for deferred harvests; however, the amount of total area with stipulations (41 acres unharvested, 27 acres with 50 percent basal area removed) is 5 acres short under these alternatives. Since the unharvested areas provide better habitat than areas with some selective harvesting, more area of better habitat would be retained than the guidance requires; therefore, the intent of the guidance would be met.

Salvage logging would generally target dead and/or dying shade-tolerant (subalpine fir and Engelmann spruce) trees. In

some cases, dead or dying Douglas-fir trees might be harvested. The shade-tolerant tree species do not appear to offer important nesting or feeding habitat for black-backed woodpeckers. However, Douglas-fir is a preferred nesting and foraging species; therefore, the removal of Douglas-fir is expected to decrease nesting and foraging habitat. Since salvage harvests reduce habitat and degrade habitat quality, the removal of Douglas-fir in this area probably does not add substantially to the effects of the project. Additionally, 63 acres would be left unharvested to provide habitat for black-backed woodpeckers. Black-backed woodpecker habitat would be reduced by 100 acres (62 percent). Since newly burned areas are a rare habitat in the area, this reduction might inhibit black-backed woodpeckers from using the area.

Cumulative Effects to Black-Backed Woodpeckers

Since no other burned habitats occur in the cumulative effects area, the above effects either add or detract from the overall landscape. The recently burned area is a rare habitat in Coal Creek State Forest; however, stand conditions are favorable for the future development of this habitat type.

> Boreal Owl

Boreal owls in Montana inhabit mature to old-growth forests at elevations of 5,000 to 8,000 feet. Nesting in the Rocky Mountains has been documented in subalpine forests dominated by subalpine fir and Engelmann spruce. Such forests are structurally complex and contain high densities of large trees, shrubby and open

understories, and a multilayered canopy. Boreal owls are secondary cavity-nesters, using holes excavated by pileated woodpeckers and flickers. Habitat quality depends strongly on the availability of large snags and trees with cavities suitable for nesting. Boreal owls apparently are not sensitive to human or mechanical disturbances. Effects of forest fragmentation on boreal owls have not been studied, but might not be of high importance due to the low energetic costs of travel by these owls (Hayward 1994).

The fire removed any boreal owl habitat that might have been present. Timber harvesting would not further alter boreal owl habitat; therefore, this species was dropped from further analysis.

> Fisher

DNRC lists fishers as a sensitive species due to their use of old-growth habitats (DNRC 1996). Fishers are generalist predators and use a variety of habitat types, but are disproportionately found in stands with dense canopies. Fishers appear to be highly selective of resting and denning sites. In the Rocky Mountains, fishers appear to prefer late-successional, mesic coniferous forests for resting sites and use riparian areas disproportionately to the availability. Fishers tend to use areas within 155 feet of water. Such areas contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept (Jones 1991). Additionally, Heinemeyer (1993) found reintroduced fishers in northwest Montana selected elevations between 1,970 and 3,280 feet and avoided elevations between 3,960

and 5,280 feet. DNRC's internal guidance aims to protect valuable resting habitat near riparian areas and maintain travel corridors.

The project area ranges between 4,600 and 5,800 feet in elevation, with 2 ephemeral streams draining the project area. This area range is in the elevational ranges avoided by fishers in the Cabinet Mountains (Heinemeyer 1993). Canopy cover was removed in the burned area, thereby eliminating fisher habitat. However, buffers along streams of 100 feet or wider and future resting habitat structures would be retained. Since salvage logging would not further affect fisher habitat, fisher will not be considered further in this analysis.

➤ *Pileated Woodpecker*

Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Due to this important ecological niche, DNRC named the pileated woodpecker to their sensitive species list.

Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are larch, ponderosa pine, cottonwood, and aspen, usually 20 inches dbh and larger (McClelland 1979, Bull 1987, Aney and McClelland 1990). Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. Aney and McClelland (1990) described nesting habitat for pileated woodpeckers as "stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The

feeding- and nesting-habitat requirements, including large snags or decayed trees for nesting and large downed wood for feeding, closely tie these woodpeckers to mature forests with old growth. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979).

For the cumulative-effects analysis, a .50-mile radius around the project area below 5,000 feet in elevation was considered. All of the area is managed by DNRC. Presently, based on the above parameters, approximately 475 acres of the 896-acre cumulative effects area provide pileated woodpecker nesting habitat in a large continuous block. The fire removed 102 acres of habitat.

Direct Effects to Pileated Woodpeckers

- *Direct Effects of No-Action Alternative I*

No disturbance of pileated woodpeckers would occur.

- *Direct Effects of Action Alternatives B and C*

Pileated woodpeckers might be displaced, however, the effects of harvesting is unknown. Bull et al. (1995) observed a marked woodpecker roosting near a harvest unit consistently throughout harvesting, indicating that some disturbance might be tolerated. Some displacement might occur, however, the effects are not expected to be measurable. Harvesting would occur after July 1 when the pileated woodpecker young would have fledged; therefore, no direct mortality effects are expected.

Indirect Effects to Pileated Woodpeckers

• ***Indirect Effects of No-Action Alternative A***

The fire removed nesting habitat of the pileated woodpecker. The surviving trees might provide nesting structure in the future stand, while the dead trees would provide feeding sites in the near future. In time, depending on the seed source and regeneration conditions, replacement trees (shade-intolerant) might not be present. Therefore, this alternative is expected to result in negligible effects in the short-term and might be positive or negative in the distant future depending on the species mix that regenerates in the burned area.

• ***Indirect Effects of Action Alternatives B and C***

Under Action Alternatives B and C, foraging habitat would not be reduced further than current conditions. The harvests would focus on subalpine fir and

Engelmann spruce, species that offer minimal foraging opportunities for pileated woodpeckers. On occasion, fire-killed Douglas-fir trees, an important forage species, would be harvested. All western larch would be retained, thereby retaining a high-quality nesting structure for the future stand and short-term feeding sites. The effects of these alternatives are expected to be minimal because of the slightly reduced feeding sites.

Cumulative Effects to Pileated Woodpeckers

Since no other projects are planned within the cumulative effects analysis, the direct and indirect effects apply to the cumulative effects area.

➤ ***Big Game***

Big game species include elk, white-tailed deer, and mule deer. No winter ranges occur within the fire area; therefore, big game species were dropped from further analysis.

CYCLONE RIDGE FIRE TIMBER SALVAGE
ENVIRONMENTAL ASSESSMENT CHECKLIST
WATERSHED/FISHERIES
ANALYSIS
APPENDIX G

WATERSHED

INTRODUCTION

Sediment Delivery

Timber harvesting and related activities, such as constructing roads, can lead to impacts to water quality by increasing the production and delivery of fine sediment to streams. Constructing roads, skid trails, and landings can generate and transfer substantial amounts of sediment by removing vegetation and exposing of bare soil. In addition, the removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics, creating natural sediment traps and energy dissipaters to reduce the velocity and erosiveness of stream flows.

Water Yield

Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and

runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition.

ANALYSIS METHODS

Sediment Delivery

The methodology for analyzing sediment delivery will be completed using a detailed sediment source inventory. All roads and stream crossings were evaluated to determine sources of introduced sediment. Protocols are outlined in State Forest Land Management Plan (SFLMP) Resource Management Standards. In addition, in-channel sources of sediment were identified using channel stability rating methods developed by Pfannkuch. These analyses were conducted in the summer of 2000 by a DNRC hydrologist.

Water Yield

The water-yield increase for the watershed in the project area was determined using the equivalent clearcut area (ECA) method as outlined in *Forest Hydrology Part II* (1976). ECA is a function of:

- the total area roaded and harvested,
- the percent crown removal in harvest, and
- the amount of vegetative recovery that has occurred in harvest areas.

This method equates the area harvested and the percent of crown removed with an equivalent amount of clearcut area. For example, if 100 acres had 60 percent crown removed, ECA would be approximately 60, or equivalent to a 60-acre clearcut. The relationship between crown removal and ECA is not a 1 to 1 ratio, so the percent of ECA is not always the same as the percent of canopy removal. As live trees are removed, the water they would have evaporated and transpired either saturates the soil, or is translated to runoff. This method also calculates the recovery of these increases as new trees vegetate the site and move toward preharvest water use.

In order to evaluate the watershed risk of water-yield increase effectively, a threshold of concern must be established. Watershed Resource Management Standard 7 in the SFLMP details the methodology for setting a water-yield-increase threshold. The procedure relies on evaluating the acceptable risk level, resource value, and watershed sensitivity. The watershed sensitivity is evaluated using qualitative assessments, as well as using procedures outlined in *Forest Hydrology Part II (1976)*. The stability of a stream channel is an important indicator of where a threshold of concern should be set. As water yields increase as a result of canopy removal, the amount of water flowing in a creek gradually increases. When these increases reach a certain level, the bed and banks may begin to erode. More stable streams will be able to handle larger increases in water

yield before they begin to erode, while less stable streams will experience erosion at more moderate water-yield increases.

ANALYSIS AREA

Sediment Delivery

The analysis area for sediment delivery is:

- the second-order tributary to Cyclone Lake located in Section 21 of the proposed project area,
- the first-order drainage located primarily in section 22, and
- the road system leading into the proposed project area.

In the center of the proposed project area, there is also a well defined draw. This draw does not have a defined channel at any point within the project area.

Water Yield

The analysis area for water yield is the Cyclone Creek watershed. Cyclone Creek is a 8,355-acre, third-order tributary to Coal Creek. The Cyclone Creek watershed contains Cyclone Lake. The Cyclone Ridge Fire burned within two tributary watersheds to Cyclone Lake. One is a perennial, second-order watershed located primarily within Section 21 of the proposed project area. This subwatershed is approximately 500 acres, has a 3-foot bank-full channel, and is in good condition. The other is a perennial, first-order creek located in Section 22 of the proposed project area. This stream lies within a 300-acre watershed. The channel is in good condition, and has a bank-full channel of approximately 3 feet.

EXISTING CONDITIONS

Sediment Delivery

The assessment of the proposed project area showed that the

existing road system is high standard and constructed of stable materials. The system was built in the late 1960s to access a timber sale. The road system is in need of surface-drainage features at standard spacing. No erosion is occurring on the road system, but removal of brush and vegetation for fire suppression access would increase the risk of surface erosion.

The project area contains several culverts at stream crossings. All are functioning properly, adequately sized, and not contributing sediment to a creek. As with the rest of the road system in the project area, surface drainage features are needed near these crossings to meet current BMP standards. Since filtering vegetation was removed when the road was reopened for fire suppression, road ditches should have slash filters installed.

The remainder of the proposed haul routes were not contributing sediment, and were brought up to current best management practices (BMPs) with the Cyclone/Coal '99 Timber Sale.

The fire has removed the majority of the ground vegetation in most areas of the fire. Fire intensity was lower in the draws and creek bottoms, but some of these areas were also burned to mineral soil. Bare soil on slopes and near creek bottoms may generate higher sediment delivery for a couple years until vegetation reestablishes. At the time of survey, sediment delivery to creeks from burned areas was not occurring.

Water Yield

Channel stability data gathered on Cyclone Creek during the Cyclone/Coal '99 Timber Sale showed the creek in good condition above and below Cyclone Lake. Creeks within the proposed project area also have

good channel stability. According to procedures outlined in the analysis-methods discussion, the water-yield threshold for the Cyclone Creek watershed is 13 percent.

Timber harvesting and associated road construction activities have taken place in the Cyclone Creek watershed since the 1960s. In the summer of 2000, the Cyclone Ridge Fire burned approximately 200 acres in the Cyclone Creek watershed. Due to the intensity of the fire, most of the trees within the fire perimeter were killed. This means that the entire burned area is now in a 100-percent ECA condition. These activities, combined with the vegetative recovery that has occurred in old harvest units, have led to a 4-percent water-yield increase over an unharvested condition in the Cyclone Creek watershed. This increase would not be measurable, as a majority of the activities, including the Cyclone Ridge fire, have taken place above Cyclone Lake. The lake acts as storage for water yield increases, so only those activities taking place below the outlet of Cyclone Lake affect the water yield in Coal Creek and downstream waters.

DIRECT EFFECTS

• *Direct Effects of No-Action Alternative A*

Sediment Delivery

No-Action Alternative A would have no direct effects to sediment delivery beyond those currently occurring. Existing point sources of sediment, both in-channel and out-of-channel sources, would continue to recover or degrade based on natural or preexisting conditions. The existing road system would have surface drainage features installed prior to closure.

Water Yield

Alternative A would have no direct effects on water yield. Existing timber harvest units and the burned area would continue to revegetate and move closer to the premanagement levels of water use and snowpack distribution.

• *Direct Effects of Action Alternatives B and C*

Sediment Delivery

Action Alternatives B and C would have no direct effects on sediment delivery. No skidding through a stream would occur, and no stream-crossing replacements would be needed. These are the only methods by which the proposed salvage would directly impact sediment delivery to Cyclone Lake.

Water Yield

Action Alternatives B and C would have no direct effect on water yield beyond those shown in the existing conditions discussion. The fire killed the timber proposed for removal. As a result, the water yield increases already occurred when the fire burned the area. Removal of dead trees would not create any effect on water yield.

INDIRECT EFFECTS

• *Indirect Effects of No-Action Alternative A*

Sediment Delivery

No-Action Alternative A may indirectly reduce the sediment delivery to the Cyclone Lake. This reduction would occur through installation of surface-drainage features on the existing road system. As stated in the existing-condition discussion, sediment is not currently being delivered to the creeks, but installation of surface drainage

features would further reduce the risk of sediment delivery. No other indirect effects are anticipated to sediment delivery from this alternative.

Water Yield

No-Action Alternative A would have no indirect effects on water yield. Existing timber-harvest units and the burned area would continue to revegetate and move closer to the premanagement levels of water use and snowpack distribution.

• *Indirect Effects of Action Alternatives B and C*

Sediment Delivery

Action Alternatives B and C may indirectly lead to increases in sediment delivery to Cyclone Lake through timber-salvaging activities, though this may occur on a reduced number of acres for Action Alternative C. A majority of the proposed project area would be yarded using a skyline system. Where possible, ground-based machinery would be used on flat benches and gentle areas on ridges. Ground-based skidding would generate soil disturbance that may lead to increased erosion. Placement of erosion control and BMP measures in all skid trails would minimize the risk of soil erosion and the subsequent delivery of sediment to a draw or creek. Skyline corridors also disturb surface soil layers where portions of logs touch the ground during yarding. These areas also present a higher risk of sediment delivery. Installation of water bars and slash would minimize the risk of sediment delivery to a creek or draw.

Water Yield

Action Alternatives B and C would have no indirect effect on water yield beyond those shown in the existing conditions discussion. The fire killed the timber proposed for removal. As a result, the water yield increases already occurred when the fire burned the area. Removal of dead trees would not create any effect on water yield.

CUMULATIVE EFFECTS

• Cumulative Effects of No-Action Alternative A

Sediment Delivery

The cumulative effect of No-Action Alternative A would likely be a net decrease in total sediment delivery to Cyclone Lake. The addition of surface drainage features and erosion control to the existing road system, when combined with the sediment load from other past management in the Cyclone Creek watershed, could lead to a net decrease in sediment delivered to Cyclone Lake.

Water Yield

No-Action Alternative A would have no cumulative effect on water yield beyond those shown in the existing condition discussion. The fire killed the timber proposed for removal. As a result, the water yield increases already occurred when the fire burned the area. Removal of dead trees would not create any effect on water yield.

• Cumulative Effects of Action Alternatives B and C

Sediment Delivery

Cumulative sediment delivery to Cyclone Lake would be the same

under Action Alternatives B and C as those discussed in the existing conditions. The direct and indirect impacts discussed above, combined with existing conditions from past management, may lead to increased sediment loads to the creeks within the project area. These sediment increases would not likely reach Cyclone Lake. If sediment were transported to Cyclone Lake, turbidity increases would be minor and may not be measurable. None of this sediment load would be able to reach the outlet of Cyclone Lake, and would, therefore, not increase sediment to Cyclone and Coal creeks or any downstream waters.

Water Yield

Action Alternatives B and C would have no cumulative effect on water yield beyond those shown in the existing condition discussion. The fire killed the timber proposed for removal. As a result, the water-yield increases already occurred when the fire burned the area. Removal of dead trees would not create any effect on water yield.

WATERSHED/FISHERIES

INTRODUCTION

The Cyclone Creek watershed contains a population of bull trout and migratory westslope cutthroat trout. The Federal Endangered Species Act lists the bull trout as a threatened species. In an effort to protect existing bull trout populations and aid in the recovery of the species, Montana DNRC is a member of the Montana Bull Trout Recovery Team (Recovery Team). DNRC is committed to following the Recovery Team's recommendations, as well as following recommendations of the Flathead Basin Forest Practices Water Quality and Fisheries Cooperative Program (Cooperative

Program).

ANALYSIS METHODS

Methodology to assess the status and potential impacts of the proposal to fish populations will include habitat-quality monitoring, population monitoring, and risk factors to habitat degradation. Habitat-quality parameters include substrate scoring and streambed core sampling for the percent of materials less than 6.35 millimeters in diameter (McNeil coring). Measurement protocols for these parameters are outlined in the Cooperative Program report. According to the Cooperative Program report, a stream is considered threatened if the substrate score is less than 10 or if the percentage of fine material is greater than 35 percent. A stream is considered impaired if the substrate score is less than 9 or the percentage of fine material is greater than 40 percent.

The risk factors to habitat degradation were evaluated with a sediment-source inventory during preparation of the Cyclone/Coal Timber Sale. The inventory included cataloging channel stability, in-channel and out-of-channel sediment sources.

ANALYSIS AREA

The analysis area for fisheries is the Cyclone Creek watershed. Population and habitat-quality monitoring data have been gathered in the Cyclone Creek watershed since 1996. Cyclone Creek is a third-order tributary to Coal Creek.

EXISTING CONDITIONS

Species-composition surveys in the Cyclone Creek watershed have identified the presence of migratory cutthroat trout and bull trout. The populations in Cyclone Creek are disjunct. The fish rear and live in

Cyclone Lake and spawn downstream at the outlet of Cyclone Lake. The creeks in the proposed project area are small tributaries to Cyclone Lake and are not large enough to support fish populations.

The Recovery Team has identified the Cyclone Creek watershed as a disjunct bull trout core area. Core areas are defined as, "...watershed, including tributary drainages and adjoining uplands, used by migratory bull trout for spawning and early rearing, and by resident bull trout for all life history requirements." (Montana Bull Trout Restoration Team, 2000) In keeping with the recommendations of the DFWP biologists and Restoration Team, DNRC has committed to a monitoring program in the Cyclone Creek watershed. The sampling in the watershed began in the summer of 1995 and is ongoing. This monitoring would continue for a minimum of 3 years after the completion of a project in the Cyclone Creek drainage. Results of the sampling are listed in TABLE G-3-FISHERIES MONITORING DATA FOR CYCLONE CREEK. The results show some fluctuation in spawning occurrences. Despite a lack of redds, DFWP personnel have found juvenile bull trout in Cyclone Creek after years when no spawning activity has been observed. Spawning activity may be occurring in other locations or at different times than sampling (Delaray, personal communication). Substrate scores and McNeil cores are well within the acceptable range in Cyclone Creek.

The sediment-source inventory showed no identifiable point sources of sediment within the channels or from upland sites. The existing road system is in need of additional surface drainage and erosion control, but no instances of direct delivery to a stream in the project area were found during the survey. Stream channels in the proposed

**TABLE G-3—FISHERIES MONITORING DATA
FOR CYCLONE CREEK**

FISCAL YEAR	BULL TROUT REDDS	SUBSTRATE SCORE	MCNEIL CORE
1996	5	11.1	33.1
1997	5	11.3	31.6
1998	0	11.6	33.8
1999	0	11.4	32.6
2000	0	11.9	No results

project area are primarily in fair to good condition. The results of this inventory, along with a water yield analysis, show the spawning habitat to be in good condition.

Direct Effects

• Direct Effects of No-Action Alternative A

Alternative A would have no direct effects on fish populations in the Cyclone Creek watershed. Direct effects would be limited to those under current and natural conditions.

• Direct Effects Common to Action Alternatives B and C

No direct effects to fish or fish populations would occur. Pulses of sediment are not expected as a result of Action Alternatives B and C, and fish do not inhabit the creeks in the project area.

Indirect Effects

• Indirect Effects of No-Action Alternative A

There would be no indirect effects to fish populations beyond those currently occurring. Existing conditions would continue to affect fish habitat and populations based on natural or preexisting conditions.

• Indirect Effects Common to Action Alternatives B and C

The action alternatives would have no indirect effects on fish populations beyond those currently occurring. The streams in the proposed project area do not support fish spawning. No spawning activity occurs in Cyclone Lake where the project area creeks meet the lake. It is unlikely that sediment from the project area would reach the lake. Should this happen, sediment would affect a small area on Cyclone Lake, but would not be transported to the outlet or any downstream waters.

Cumulative Effects

• Cumulative Effects of No-Action Alternative A

The cumulative effects of Alternative A would be similar to those described in the existing conditions. Fish habitat and populations would not be altered by this alternative.

• Cumulative Effects Common to Action Alternatives B and C

Action Alternatives B and C would have no cumulative effects to fish populations or fish spawning habitat. No water-yield increases would result from these alternatives, therefore, no impacts to channel stability would occur in the creeks in the project area. The creeks in the project area do not contribute surface flow to a spawning stream.

CYCLONE RIDGE FIRE TIMBER SALVAGE

ACRONYMS

BMP	Best Management Practices	MEPA	Montana Environmental Policy Act
dbh	Diameter at breast height	MMBF	million board feet
DFWP	Montana Department of Fish, Wildlife and Parks	NWLO	Northwestern Land Office
DEIS	Draft Environmental Impact Statement	SFLMP	State Forest Land Management Plan
DNRC	Department of Natural Resources and Conservation	SLI	stand-level inventory
EA	Environmental Assessment	SMZ	streamside management zone
ECA	equivalent clearcut acres	USFS	United States Forest Service
EIS	Environmental Impact Statement		
FEIS	Final Environmental Impact Statement	124 Permit	Stream Preservation Act Permit
FI	forest improvement		
FNF	Flathead National Forest	3A Authorization	A Short-term Exemption from Montana's Surface Water Quality Standards
Land Board	State Board of Land Commissioners		
MBF	thousand board feet		



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